

MARINE REVIEW

WEEKLY.] AND MARINE RECORD. [ESTABLISHED, 1878.

Vol. XXVIII Eastern Office,
1023 Maritime Bldg., New York City
Chicago Office, 373 Dearborn St.

CLEVELAND, O., JULY 23, 1903.
Published every Thursday at 39-41 Wade Bldg.
by the Marine Review Pub. Co.
[Entered at Cleveland Post Office as second-class matter.]

Subscription \$3.00 year.
Foreign \$4.50 year.
Single Copy 10 cents.

No. 4

SAVING THE STEAMER JOHN CRAIG.

Port Huron, Mich., July 21.—Undoubtedly the release of the steamer John Craig from Simmon's reef, upon which she ran on June 26 last, will be regarded as a most successful recovery. For a while it looked as though the steamer would have to be abandoned to her fate. The bringing up of the steamer on this reef, too, shows that the spot has not been adequately marked. At the time the Craig was proceeding under double check, probably making about 4 miles an hour. She was drawing 16 ft. 10 in. of water. She ran upon the shelving rock, which was covered with barely 16 ft. of water, and as she slid upon it she listed until she was almost on her beam's end. The rock terminated in a sort of pinnacle and upon this the steamer settled until it crushed its way through the bottom of her bow and projected 5 ft. into the hold. Then the action of the waves and the inrush of water caused her to swing completely around with the rock as a pivot. Soundings were immediately taken and the pumps put at work, but, of course, they made no progress whatever. The steamer filled with water to the level of the lake.

The first attempt at repairing the damage was to endeavor to patch the hole. Sufficient of her cargo of corn was jettisoned to permit her to rise so that divers from the wrecker Favorite could work under her bottom. Some progress was made in

in her hold about 50,000 bu. when she reached Port Huron. The lighter Newman was sent for to remove it.

Capt. John Perew, who supervised the work of saving the steamer, would not talk of the exploit at all save to say that the job had been an expensive one. From external appearances the Craig looks none the worse for her encounter and it will not be apparent until she is dry docked how ugly was the punch she got.

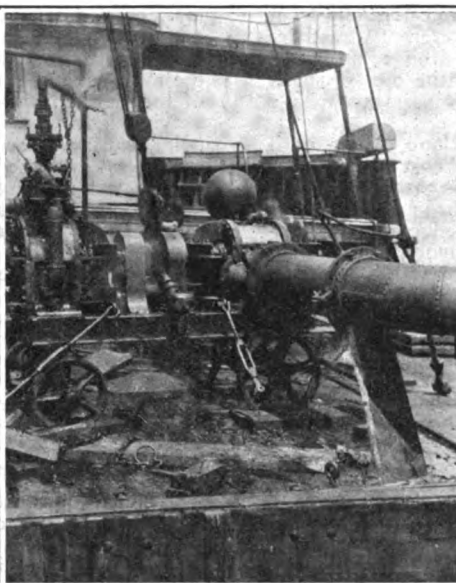
REVIVAL OF SHIP BUILDING AT CHARLESTOWN.

With ceremonies that at first thought seemed unduly elaborate for the occasion the 250-ton naval tug Pentucket was launched at the Charlestown navy yard last Saturday. Doubtless the presence of the commandant and other distinguished naval officers and their families, music by the marine band, and the honors shown the little craft as she slid down the ways by other ships in the vicinity, would be reserved at other places for larger ships, but it must be remembered that the mere christening of the tug was of secondary importance. The real object of the extensive ceremonies was the celebration of the resumption of ship building at the yard after an interval of about thirty years. The tug was christened at 4 o'clock by Miss Martha Demarris Ring, daughter of Pay Director James A. Ring, United States navy. Previous to that hour Rear Admiral Johnson and other officers of the yard

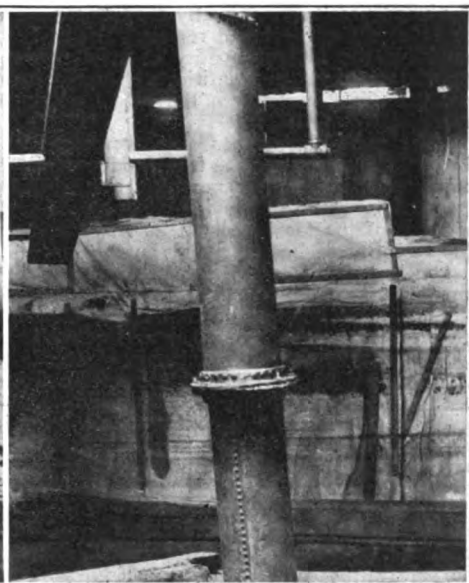
PHOTOS TAKEN OF WRECKING OPERATIONS ON STEAMER JOHN CRAIG.



Pumping out Forward of Bulkhead.



Type of Pumps used on the Craig.



View of Bulkhead built by the Wreckers,
Pump Pipe in Foreground.

patching the hole in this manner, but the attempt was totally frustrated by a storm which caused the steamer to settle more securely on the rocks than ever. It then looked as though all efforts to save the steamer would have to be abandoned. The wrecking operations were under the direction of Capt. John Perew, representing Worthington & Sill, underwriters of Buffalo. He conceived the idea that the only possible way of saving the steamer was by building a bulkhead in the hold, aft of the hole in her bottom. The hole was directly under the first hatch, being 10 ft. wide and extending forward about 15 ft. The effect of the collision with the rock had been to force the timbers of the bottom up into the hold about 7 ft. There was altogether about 18 ft. of water in her. Divers descended into the hold and began to build a bulkhead about 6 ft. aft of the first hatch. Work upon the construction of the bulkhead was slow, owing to the difficulties which it presented, being constructed entirely under water, but it went steadily forward until it was absolutely water-tight. Seven pumps were then put at work and the volume of water aft of the bulkhead was pumped out. No further attempt was made to patch the hole until the Craig reached St. Ignace, where she was taken in tow of the wrecker Favorite. At St. Ignace a temporary patch was placed over the hole from underneath and the Craig started for Port Huron in tow of the City of Naples with the pumps steadily working on her. When she got to Port Huron there was still 500 tons of water forward of the bulkhead. No difficulty was experienced in towing her across Lake Huron. She will be taken to Cleveland to be repaired.

About 45,000 bu. of corn were jettisoned and there remained

with their families had taken places near the bow of the tug which was to be launched. In the shops there was a sort of holiday, and the workmen crowded every point of advantage. Many civilians also came to the yard to see the launching. On the cruiser Atlanta the crew manned the rigging and marines and sailors crowded the Wabash. At a signal from Admiral Johnson, Miss Ring broke the customary bottle of wine on the prow of the tug and christened it Pentucket, which is the Indian name for Haverhill, the home of Secretary of the Navy Moody. The tug slid off the ways and rode gracefully on the water, her maiden dip being greeted with whistling from tugs, steamers, launches, locomotives and everything else that had a whistle in the neighborhood.

The Pentucket is officially called a sea-going naval tug and in appearance will be very much like the big ocean towboats that tow coal barges up and down the coast. She is 92 ft. 6 in. in length between perpendiculars, 21 ft. 1 in. beam and will draw 9 ft. of water. She has engines of 450 H. P., is rigged as a two-masted schooner and is designed to sustain a cruising speed of 12 knots an hour. When complete she will have cost \$70,000.

The Cunard Steamship Co. at a special meeting on July 29 will consider important resolutions. One is that no foreigner shall hold office as a director or principal officer of the company. Another is that the capital shall be increased to £2,000,000 by the creation of a new share of the value of £20, to be called a government share and to be issued to a nominee of the government. The purpose is to insure exclusively British ownership of the company.

GREAT BRITAIN LOOKING FOR ORES.

The fact is most significant that the British Iron Trade Association has asked the government to instruct its consular officials throughout the world to collect information and report on the iron ore resources of many countries with a view to assist British iron makers in their search for the raw materials needed to carry on the industry. In its letter to the prime minister the association has suggested the appointment of a royal commission to inquire into the question of raw materials and to collect through the consuls all facts relating to the iron ore supplies which it concerns the buyer and the user of such ores to know.

This application illustrates the changed position of Great Britain as an iron manufacturer. It was not many years ago that the British boasted of the great advantage they enjoyed in the fact that their iron ore, coal and the limestone needed for fluxing were near together so that they could turn pig iron out of their blast furnaces more cheaply than any other country. In the great iron ore districts of Cleveland, south Scotland, Staffordshire and Lincolnshire the ore and coal were side by side, while in no district of the kingdom were they separated by more than 100 miles and in hardly any district by more than fifty or sixty miles.

On the other hand in the United States the ores and the coal were generally about 1,000 miles apart, except in Alabama; and in Germany the bulk of the ore had to be carried by rail to the coal over distances varying from 100 to 150 miles. Today, however, Great Britain is bringing millions of tons of iron ore thousands of miles to her coal and the reason is interesting. Great Britain still possesses enormous resources in iron ore. But a great change has occurred in all the iron markets. The use of iron is decreasing, while the demand for steel is growing every year. A very large variety of articles once made of iron are now made of steel, and the fact is deeply regretted by all British manufacturers that the larger part of their native iron ores contains too much phosphorus for the production of iron suitable for the manufacture of Bessemer and Siemens steel.

The most important iron ore district of the kingdom is the Cleveland district, near the east coast, south of Newcastle. Until about twenty years ago the iron ore from which its millions of tons of pig iron were annually produced came almost wholly from the hills of the Cleveland region. Today, however, the vast demand for the highest quality of steel-making iron compels the importation of large quantities of foreign hematite ore, which is now used in Cleveland to the extent of nearly 3,000,000 tons a year.

The same change has also overtaken Scotland, where until about fifteen years ago the iron produced was almost wholly from local ores, whereas now nearly one-half of it is made from ores imported in order to provide a quality of pig iron suited to the demands of the local steel works. Scotland produces a considerable quantity of hematite ore, but nothing is more certain than that in the near future Scotland must rely increasingly upon imported ores.

The most important iron-making district after Cleveland is the west coast, that is to say west Cumberland and northwest Lancashire. The total product of pig iron in this district exceeds 1,500,000 tons yearly; and that of steel is from 700,000 to 750,000 tons. The pig is chiefly produced from local hematite ores, this being the only important center of such ores in the British Isles, but the local supplies have in the past three or four years been largely supplemented by imports of hematite ores from foreign countries.

The fact that Germany today is producing more steel, though not more pig iron, than Great Britain is due to the poverty in steel-making ores of the British Isles. The result, therefore, of the substitution of steel for iron in many manufactures is that Great Britain can no longer say that the supplies for its blast furnaces are near together. Nearly the whole of the ore for the most important form of iron that is used in the manufacture of Bessemer steel or mild steel is brought 1,000 miles over the sea from Spain. Some of it comes from other countries, but Spain is the largest source of supply. It has been evident for some time that the mines of north Spain will not for many years longer be equal to the demands which Great Britain and, to a less extent, Germany, are making upon them. Evidences of approaching exhaustion are already apparent in some of the best Spanish districts. It is an imperative necessity that Great Britain should secure other sources of supply of hematite ores. Another fact that has helped to wrest the supremacy in iron and steel from Great Britain is that richer ores are found and worked in some foreign lands. Even the best Cumberland and Lancashire hematite ores have but 57 per cent. of iron, while the Cleveland iron ore is very much leaner. Our Lake Superior ores, on the other hand, contain from 59 to 65 per cent. of iron, while the Gellivara mines of northern Sweden give a 68 per cent. iron.

Thus it happens that Great Britain, which had always held the premier position among iron producing countries, has lost its supremacy. Thirteen years ago the United States wrested the lead from Great Britain, and except for two years has held it ever since. Fifteen years ago the British production of ore was double that of the United States. But the British have now been left far behind; and there is every indication that within a very few years the blast furnaces of this country will produce far more than twice as much iron as those of Great Britain.

The Proteus is being fitted out as a cable ship in the Philippines to replace the Burnside, which is now engaged in laying Alaskan cables.

HELIGOLAND FAST-FLASHING LIGHT.

The state department at Washington has received a copy of the German periodical *Ueber Land und Meer* containing an interesting account of a new electric fast-flashing light. The article says:

"Members of the shipping, industrial and commercial world will find much to interest them in the new flash light erected by the German empire on the island of Heligoland in the North sea. Germany is particularly proud of the results. The system or principle employed is said to be entirely new. Not only that, but it was said to present absolutely insurmountable difficulties. The era that opened with 1900 is one that delights in nothing so much as in solving 'unsolvable' problems and doing 'impossible' things. The revolving light on Heligoland is not only the largest in the world, it is the most unique, for Germans claim that it never had a model. Special praise is given, and it is claimed that special credit is due, to the empire's technicians who persisted in their purpose until they perfected their plans, for they had to do it in the face of warnings from experts in all parts of the world. They built upon the superiority of the German reflector, with its exactly parabolic ground-glass mirror or speculum, and the marvelous success of the Heligoland fast-flashing light has justified German effort, skill and courage. In these lines, for a long time, France was in the lead. It looks as if she would have to guard her laurels. The reflector, invented by Schuckert, with its parabolic mirror, is easily earning a place by the side of the world's very best work. It took a long time to get a hearing for the glass parabolic mirror in the lighthouse world. The bright fires—'feux éclairs'—of the system, based upon a combination of Fresnel lenses and totally reflecting ring prisms, which were built by the French with marvelous skill and accuracy, blocked the way to the new lights.

"About the middle of the nineties German experts were sent to France by the German imperial government for the express purpose of studying flash lights. The experts stayed long enough to find out all that was best in the French system, aided thereto by the kindness of the scientific men of the republic. Before their return they were convinced that by means of two or more reflectors, erected upon a reflector with Schuckert's glass parabolic mirror, results equal to those of France could be produced. Experiments were made in Nuremberg. They went far beyond what the most sanguine had believed possible. The revolving reflector of the German apparatus was fully equal to the Frenchman's revolving light. As soon as the experts had demonstrated their point, work was begun on a light reflector or projector equal to the largest ever used. It was to represent 30,000,000 candle power and to last no longer than one-tenth of a second. The flashes must follow each other every five seconds.

"The flash light illumines the entire horizon. In normal weather it may be seen 23 sea miles (23 leagues). When the weather is favorable, the beams go far beyond the central fires or light rays. On the first night that the new light was used, its peculiar flashing beams were seen by people standing on the Mole at Busum, a distance of 65 kilometers, or a trifle over 40 miles. The watchers in the lighthouse at Amrum, about the same distance, were able in unfavorable weather to see the same beams as they rapidly appeared and disappeared. It was noted that the otherwise bluish-white light of the electric arc appeared red."

NEW TRAINING SHIP CUMBERLAND.

Preparations are now being made to begin work on the training ship Cumberland, which is soon to be built at the Charlestown navy yard. Assistant Naval Constructor Guy A. Bisset, who is in charge of the building of the hull, has received orders from the navy department authorizing him to go ahead with the construction. In compliance with this order he has begun to clear the site for the laying of the keel, and is making ready for the issuance of orders to all of the heads of the sub-departments under his care directing them to go ahead with their share of the work. Supt. Robertson of the boatshop has cleared the upper floor of his building, and is now getting ready to lay down the lines of the training ship. A fine completed model showing the hull, masts and all of the fittings of the ship will be constructed also. The modelmaker will have charge of this job. As soon as the lines of the ship are laid down and taken off on paper requests for the necessary steel frames and plates will be sent to the rolling mills, and the actual construction will be begun immediately on their arrival. The Cumberland will be built on the ways from which the tug Pentucket was launched a few days ago.

"American shipping in foreign waters is laboring against tremendous odds and I venture to say that not another ship will be built here to sail in foreign waters to compete for foreign trade under the American flag if the United States government does not do something to relieve shipping." Thus spoke Capt. William F. Humphrey, ship owner, associated with the Boston Towboat & Steamship Co. Capt. Humphrey's contention is that American ships pay better wages, feed the crews better and that the cost of operation is consequently higher. He believes that there is splendid prospect of trade with the orient if the government only stimulates shipping.

The coal fueling scow Perry, designed and built by the C. O. Bartlett & Snow Co. of Cleveland for the Pittsburgh Coal Co., recently put 215 tons of run-of-mine coal on a steamer in Cleveland harbor in 34 minutes. This is equal to 300 tons an hour and is an especially creditable performance.

SHIPPING OUTLOOK NOT ENCOURAGING.

Too many Vessels for Present Volume of International Trade—England Wants Scouts Instead of Second and Third-class Cruisers
—Scotch Letter.

Glasgow, July 13.—There is little to report of the ship building world in its industrial aspects, for there is no improvement in the demand for new ships and little likelihood of any before the autumn—if then. But the depression in the ship yards is having its effect on the iron and steel markets, and it will, in time, help to clear the situation. The tendency of coal to a lower range of prices is a good feature, but the outlook for ship yard workers during the next few months is not bright by any means. So far, the ship yards have had a great deal of repair work on hand, even when bare of new constructive work, but that will taper off, for it is becoming abundantly evident that the best course for "tramp" owners just now is to lay up their boats altogether till the clouds roll by. The fact that, according to Lloyd's latest returns, there are now 29,943 merchant vessels in the world of an aggregate of 33,043,131 tons, is sufficiently depressing to all who perceive the shrinking volume of international trade. Of the total, 16,006,374 tons are under the British flag, but then under that flag are still most of the vessels of the Morgan combine. The tonnage under the American flag is given by Lloyds as 3,611,956 tons (including only the steel vessels of the great lakes, not the wooden ones), and under the German flag as 3,283,247 tons. The rest are nowhere—Norway 1,653,740 tons, France 1,622,016 tons, Italy 1,180,335 tons, Russia 809,648 tons, and so on downwards. Of eighty-nine steamers in the world of over 10,000 tons each, forty-eight are under the British flag, twenty-six under the German flag and seven under the American flag.

SCOUTS INSTEAD OF THIRD-CLASS CRUISERS.

The admiralty has decided to defer the construction of the three third-class cruisers provided for in this year's programme, as the intention is to substitute ultimately vessels of the new scout class. Recent cruisers of the second and third class have been unfavorably regarded by naval strategists. There are in warfare duties which such unarmored and moderate-speed vessels may perform, but our vessels of the naval defence act and of recent build are quite adequate for such work, while our fleet of seagoing high-speed craft is limited. We have nothing but armored ships capable of exceeding 21 knots under the best conditions, and the eight vessels of the "P" class only attained this result with an air pressure in the stokehold of from 2 in. to as much as 5 in., which cannot be accepted as convenient in service. The scouts, on the other hand, are to steam at 25 knots on a trial under conditions analogous to those which will obtain in warfare. Something has to be forfeited to get this high speed, but the result of recent maneuvers of both the British and foreign fleets has shown that such vessels will be of great benefit in watching commerce destroyers and hanging on to them beyond gun range until assistance can be got from more powerful protectors. As "eyes" of a fleet these ships are also of incalculable value. The more "eyes" a fleet has the greater will be its chances of bringing an enemy to action, for the tactics of a weaker power is to harass rather than to fight, or to maneuver for the engagement of the enemy's force in detachments. The only fighting advantage the third-class cruiser has over the scout is in having two 6-in. quick-firers. The four admiralty scouts should be ready for trial by their respective builders—Fairfield company, Vickers company, Laird Bros. and Armstrong company—early next year, and these will determine the future action. Four more are soon to be ordered, but should all results be satisfactory with the first lot, three will also be given out to contract without delay, in place of the three third-class cruisers.

NOT SO MANY LABOR DISPUTES.

The year 1902 was less affected by labor disputes in this country than the preceding year. The total number of stoppages was comparatively small, and though they affected a larger number of persons than in any of the last five years, the aggregate number of working days lost was not only less than in 1901 but was below the average of the five years. The 442 new disputes recorded in 1902 involved about 260,000 workpeople, or about 2.9 per cent of the working-class population of the United Kingdom. The aggregate duration of the disputes, new and old, in progress during the year was about 3,500,000 working days, nearly three-fourths of which was accounted for by disputes in the mining and quarrying industries. This amount of working time lost seems large, but if spread over the total working population it amounts to less than half a day per head during the year. With respect to the results of the disputes of 1902, if we omit the disputes which took place between different classes of workpeople (disputes in which their employers were only indirectly interested) the balance of the results of the remainder was distinctly in favor of the employers. The number of actual stoppages settled by arbitration or conciliation was twenty-nine. The great bulk of the disputes were ultimately settled by the parties themselves or their representatives, the principal agencies for arbitration and conciliation being more largely concerned with the prevention of strikes and lockouts than with their settlement. Thus the various permanent boards of conciliation and arbitration are known to have settled 678 cases during the year, in nine only of which had a stoppage of work taken place.

The Spanish government seems undecided as to the future naval position of Spain, but the president of the council and the minister of marine are determined that the navy ought to have a special vote, and the Spanish naval commission has now fixed on

about \$140,000,000 as the minimum amount to be spent in twenty years. This will pay for seven battleships of 15,000 tons, three armored cruisers of 22 knots of an improved Reina Regenta type, three small cruisers of 25 knots, several submarine boats of the French type, a training ship, and various auxiliary vessels. It is also intended to improve the condition of the state arsenals.

PLANS FOR 13,000-TON BATTLESHIPS APPROVED.

Secretary Moody has approved the plans submitted by a majority of the members of the board of construction for the 13,000-ton battleships Idaho and Mississippi and has directed that preparation for securing bids to construct these vessels be begun. Rear Admiral Bradford, a member of the board, who was absent on duty when the approval of the plans was given by his colleagues, objected emphatically to the low speed and small coal carrying capacity provided for, and that Rear Admiral Melville, another member, while approving the plans, indicated that the vessels would not be up to date on account of the reasons given by Admiral Bradford. Admiral Bradford made the point that as he and Admiral Melville were in agreement the board was divided evenly. The other members are Rear Admirals O'Neil and Bowles.

The plans provide for ships of from 16½ to 17 knots and full coal capacity of 1,750 tons. Admiral Bradford, in his objections, pointed out that he and Admiral Melville were in favor, for tactical reasons, of giving the vessels a speed of 18 knots and a coal carrying capacity of 2,000 tons, "in order that they may not be outclassed in fleet formations by all other battleships laid down since the Maine class, inclusive." He says also that "it was our belief that the ships should then be designed with as powerful means of defence and offence as their displacement permitted."

Admiral Bradford questions the fairness of a statement of the majority report that the board had agreed upon plans for vessels with a trial speed of 16½ to 17 knots and full coal capacity of 1,750 tons. This was not, he holds, a frank expression of the opinion of a majority of the board. After saying that he desires personally to be on record as opposed to the speed and coal carrying capacity agreed upon, he asserts that since 1898 the board on construction has adhered to 18 knots speed for battleships, and he cites the Charleston class as an instance of the sacrifice of offensive and defensive power in order to gain speed. The Maine class, with lower tonnage than the Idaho and Mississippi, has a speed of 18 knots and good offensive and defensive power, and Admiral Bradford asserts that this class can be improved upon with 13,000 tons allowance, even in retaining 18 knots speed and 2,000 tons coal capacity.

In an answer to Admiral Bradford, Rear Admiral O'Neil, the chairman of the construction board, holds that as a majority of a quorum approved the plans they should stand, and he asserts that neither Admiral Melville nor Admiral Bradford suggested any practicable method of endowing the vessels with greater speed and greater coal-carrying capacity, which he admits are very desirable qualities. In general, Admiral O'Neil maintains that if the vessels had greater speed and more coal space, great sacrifices would have to be made in armor and armament. A recommendation that Secretary Moody adhere to his approval of the plans was made by Admiral O'Neil. Admiral Bradford has not given up the fight, however, and will file an answer to Admiral O'Neil.

BESSEMER AND HIS WORK.

"Forty-eight years ago the metallurgical world of that time was greatly startled by the announcement that a Mr. Henry Bessemer proposed to read a paper at the meeting of the British Association on the manufacture of steel without fuel. It was natural that such a paper should evoke general interest and much incredulity," says the London Iron and Coal Trades Review. "The only descriptions of steel then produced were the crucible and puddled varieties, both of which required a large consumption of fuel. The total quantity of steel produced throughout the world was hardly more than 150,000 tons. More than one-third of this quantity was produced in Great Britain. The remainder was made chiefly in Russia, France, Sweden and Germany. The United States produced none at all. The cost of the manufacture of the pre-Bessemer steel was so great that it could only be applied in homeopathic doses to such industries as cutlery, where the selling price of the ultimate product was very high. The idea of producing steel without fuel naturally, in these circumstances, opened up a vista of possibilities that have since then been more than fully realized. To-day a single average American Bessemer plant will produce, and does produce, almost as much steel in a single month as all the countries of the world then produced in a whole year. The cost of producing steel prior to Bessemer's invention was from £30 to £70 per ton, according to its quality. By the Bessemer process, steel equally suitable for many purposes has been, and is daily being, produced for £3 per ton, and the railroads of the world are almost universally laid with rails made by Bessemer's process."

According to cable dispatches the Belgian inventor Carels has just constructed a new screw propeller that can be stopped and reversed instantly. Steamships and other watercraft fitted with this invention obey it immediately without any injury to their shafts. It is understood that the first trials of the propeller have proved very successful.

TURKISH CRUISER MEDJIDIE.

Preparations for Launching at Cramp Ship Yard Saturday—Other Delaware River Ship Building Items.

Philadelphia, July 22.—The Turkish cruiser Medjidie, which is to be launched Saturday at the Cramp ship yard, is the first vessel built for the Ottoman navy in this country. When launched she will be the most-nearly completed warship ever sent overboard. The Medjidie is named by the sultan of Turkey in honor of his father and is intended to be the best-equipped and fastest cruiser in the sultan's fleet. In the contract with the Cramp company it was stipulated that the cruiser should be at Constantinople. The Bethlehem Steel Co. has the contract to furnish the Medjidie's armament and it will be placed in position in September, after which, with a small Turkish guard, one of Cramp's navigators will take the vessel across the sea and make formal delivery of it to the sultan's officers. The contract speed of the cruiser is 22 knots. Speed was one of the points looked after, as is evident from the construction of the vessel. The building of the vessel has been closely watched by Lieuts. Ali Bey and Sabre Bey of the Ottoman naval service, who rank high as experts in naval and marine construction and engineering. Beyond stipulating general plans, the sultan left the Cramp company free to build the cruiser according to its own ideas and the result is that the Turkish ruler will get a ship that can be depended upon to make excellent speed. The Medjidie will represent the latest development of protected cruisers of the second-class and will be fitted with the most modern appliances as well as comforts for officers and crew. She will carry a crew of sixteen officers and 280 men. The cruiser's dimensions, etc., are as follows: Water-line length, 330 ft.; extreme beam, 42 ft.; mean draught, 16 ft.; displacement, about 3,250 tons; horse power, 12,000, and a speed of 22 knots. She will be fitted with two masts with military tops. Her battery will comprise two 6-in. guns mounted fore-and-aft on the center line, eight 4.7-in. guns mounted broadside, and six 3-pounders and six 1-pounders, rapid-fire guns. A protective turtle-back deck, with a maximum thickness and an armored conning tower, will complete the protection from gun fire. She will be fitted with modern triple-expansion engines and Niclausse water-tube boilers. Before the Medjidie is taken abroad she will have her builders' trial and later her official trial off the Delaware capes. It is predicted that she will exceed the contract speed of 22 knots with but little trouble. The final payment on the cruiser is to be made before she leaves the Delaware river.

The question of whether this cruiser would be christened in the usual way by having a bottle of champagne broken across her bow was for some time in doubt. This was due to uncertainty concerning the sultan's wishes in the matter. The Koran has some very explicit and direct commands anent the use of wine and the sultan, being "Khaleefe," the direct successor to Mahomet as the head of the Faithful, it was anticipated that he might object to wine and order a bottle of some other sort of liquid—perhaps water. But the christening question has been agreeably settled. Wine will be used and Mrs. Edwin H. Cramp, wife of one of the officers of the ship building company, will be the sponsor. It is said that if the Medjidie fulfills all requirements and meets with the sultan's favor, other orders for American-built war vessels will follow.

While "comparisons are odious" one cannot help but notice the difference between the Medjidie and the Pennsylvania—the latter one of Uncle Sam's new war vessels which lies near the sultan's vessel. The Pennsylvania has a length of 502 ft. and beside her the Medjidie seems somewhat dwarfed. Each week sees the Pennsylvania nearer readiness for her launching on Aug. 22. Old-time ship builders are reminded by the Pennsylvania of the building of the man-of-war Pennsylvania, which was constructed in 1846 at the Philadelphia navy yard. The old Pennsylvania was at that time the largest wooden man-of-war in the world. She was a 70-gun, three-decker line-of-battleship; was partially burned at the Norfolk navy yard during the civil war, and afterwards was made into a receiving ship.

The torpedo destroyer Hull, built at the Harlan & Hollingsworth yards, Wilmington, Del., left the League Island navy yard Sunday for Norfolk. She received her ordnance and underwent several satisfactory trials at the League Island yard. She is commanded by Lieut. Robinson, a son-in-law of Capt. Clark, of Oregon fame. The Hull will go from Norfolk to Washington, where her battery will be completed, after which she will take part in the naval maneuvers off the New England coast.

A special meeting of the Wilmington, Del., Board of Trade was called for Monday night last, to consider the question of urging the creditors of the Harlan & Hollingsworth Co. to give the company an extension of time in meeting its obligations. The solid business men of Wilmington have been afraid that the Harlan & Hollingsworth Co. might be forced into bankruptcy. Some of the creditors, it is alleged, wish to shut down the plant and take charge of the assets. As this would mean the throwing of 1,500 persons out of work and the loss to the city of the weekly payroll of \$20,000, the Board of Trade wishes to prevent such a step. Attorneys are of the opinion that the assets of the company cannot be applied by the receiver of the United States Ship Building Co. to the indebtedness of that concern. The Harlan & Hollingsworth Co. has many contracts under way, and the management is confident that it can weather its present troubles if the creditors are not too pressing.

In connection with the foregoing it should be noted that William S. Hilles, attorney for the Harlan & Hollingsworth Co., and James Smith, Jr., receiver of the United States Ship Building Co., have sent out notices to the creditors of the Harlan & Hol-

lingsworth Co. asking them to meet today (Wednesday) at the ship building company's office, to consider a plan that is to be submitted whereby the creditors' interests will be protected and, it is hoped, the financial troubles of the company amicably arranged. What the "plan" is will not be known until the meeting is held.

Capt. William G. Randle of the New York Ship Building Co. has charge of the arrangements for the launching of the steamship Mongolia on Saturday and has everything practically ready for its success. The Mongolia is the largest vessel ever constructed on the Delaware, and, with one exception, in the United States. The steamship was originally contracted for by the Atlantic Transport Co. and was later sold on the ways to the Pacific Mail Steamship Co. The keel of the Mongolia was laid thirteen months ago and had it not been for delay in receiving material the steamship would have been completed in eleven months. The Mongolia has a length of 625 ft. and will be used in passenger and freight service between San Francisco and China and Japan. At the launching Miss Kennedy, daughter of Julian Kennedy of Pittsburg, one of the largest stockholders in the ship building company, will be sponsor. Prominent officials of the Pacific Mail Steamship Co. will be present at the launching. It is probable that the keel of the new armored cruiser Washington will be laid at this yard Saturday. Everything is in readiness for the event, which will be of much consequence to New Jersey, inasmuch as the laying of the keel is the first cruiser's keel ever laid in the state and is to be duly celebrated. The plates for the Washington's keel have been punched and the blocks are all in place.

The barge Willscot, 1,856 tons, Darrah & Elwell agents, now loading coal at Philadelphia for San Diego, has in her hold a unique device for extinguishing fire. The Willscot has pipes distributed under her decks, which, if fire breaks out, can be filled with water pumped from over the ship's side. The water forced into the pipes and from them to the vessel's hold, is expected to quickly quench the most stubborn fire.

The steel tug Flemington, launched at the Neafie & Levy ship yard a few days ago, and which is for the Central Railroad of New Jersey, will be ready to go into service within a month. She will be sent to New York to engage in harbor service.

BRITAIN NOT ABANDONING SUBSIDIES.

Under the caption of "Britain Abandons Ship Subsidies" the Cleveland Plain Dealer recently published an editorial which has been somewhat extensively quoted. It now appears that newspapers that have always denied that Great Britain paid any subsidies are repeating the erroneous statement referred to from the Plain Dealer. There are several ways by which Great Britain encourages her merchant shipping. These were set forth in the report of the United States commissioner of navigation for 1899, as follows: Mail contracts and mail pay, \$3,755,395; colonial mail contracts, \$705,450; mail contracts not ascertained, about \$100,000; admiralty subvention, \$316,323; retainers to merchant seamen, \$606,853; refund to British ships with naval reserve apprentices, about \$150,000; Canadian fishing bounties, \$157,504; total, \$5,851,525. So that the dropping of the admiralty subvention, which is all that is proposed, means a reduction of between 5 and 6 per cent. of the amount of the subsidies paid by Great Britain to her merchant shipping.

But when to this we add the special annual subsidy of \$750,000, which the British government has but just agreed to pay to the Cunard Line for twenty years, for running two steamships of 24 or 25 knots speed per hour, the "abandonment" of subsidies by Great Britain turns out to be a substantial increase instead.

The Plain Dealer should know, too, that the British government has further agreed to advance to the Cunard company the money required for the construction of these ships—several millions of dollars—which the company will be allowed twenty years in which to repay, the special subsidy received by the company during the same time sufficing to pay the cost of building the ships probably twice over.

It would be extremely interesting to know what the Plain Dealer would say if the United States government should execute a similar contract with an American steamship line. But, as to abandoning subsidies—why, to paraphrase the redoubtable Paul Jones, "Great Britain is just beginning to fight!"

CONDITIONS AT BATH IRON WORKS.

Bath, Me., July 22.—Careful inquiry into existing conditions here shows that there is not the slightest danger of the Bath Iron Works shutting down, curtailing its business or removing to some other place as a result of the unsettled condition of affairs in the United States Ship Building Co. Pessimistic views of the situation are plentiful but the facts regarding the business of the iron works do not appear to justify them. It is industrially sound. Work on hand includes a \$4,000,000 contract from the United States government, three tugs for the New York, New Haven & Hartford Railway at a cost of nearly \$100,000 each and other minor work. There is no truth whatever in the report that the plant is to be removed to New London.

Twenty sets of wireless telegraph instruments have been ordered by the bureau of equipment for use on board the flagships of the American navy. The Topeka and Prairie will soon install a full set of wireless telegraphic instruments for experimental purposes. The invention to be experimented with is an American one.

SHIP BUILDING COMPANY'S TANGLE THICKER.

Further complications have now ensued in the affairs of the United States Ship Building Co. In the United States circuit court in Trenton last Saturday Judge Kirkpatrick signed an order permitting the Mercantile Trust Co. to file a petition for the foreclosure of the mortgage it holds on the property of the ship building company as trustee for the holders of \$16,000,000 first mortgage bonds. The order permits counsel for the trust company to file its petition in any United States district court. A date will then be set for argument on the petition to foreclose. Counsel for the trust company in their application for the order recited that the company had defaulted in the last half yearly interest payment on the bonds and on these grounds the court issued the order. Attorneys for the trust company say that the application to foreclose is a technical legal proceeding. This action, it is explained by counsel engaged in the case, is a step in the reorganization plans of the Sheldon committee. Without a foreclosure the committee could not proceed with its plans so long as one bond had not been deposited. The application made, therefore, indicates that the committee is preparing to act whether the consent of the protesting bondholders shall be secured or not. This attempt to foreclose will be bitterly fought by the minority. Said a member of the minority bondholders:

"We contend that the receiver can make the company earn enough to meet its obligations. If the ship yards themselves do not earn enough, as we believe they do, then the earnings of the Bethlehem Steel Co., fairly distributed, will enable the company to pay its debts including the interest on its bonds."

The minority have sent the following circular to the first-mortgage bondholders:

"In the argument before the court it was clearly brought out that, notwithstanding the complete ownership by the United States Ship Building Co. of the entire 300,000 shares of the Bethlehem Steel Co., the latter company was not permitted by the parties who gained control of the ship building company through the stocks and bonds issued to them for the Bethlehem stock, to contribute its quota of earnings to the parent company. Our investigation convinces us that the situation of the company is such as to entitle us to the payment of the July interest on the first-mortgage bonds if the profits belonging to the company are properly applied. By the terms of the collateral second mortgage, the Bethlehem Steel Co. is required to keep \$4,000,000 of surplus current assets—that is, of current assets over and above its current liabilities. On page C of the reorganization plan, it is stated that the Bethlehem Co. has \$4,500,883.25 of such surplus assets. If that were all the surplus assets which the company had, it could still contribute \$500,883.25, by way of dividend, out of its large earnings, to the ship building company, which would leave it with the required amount of surplus assets and be more than enough to pay the July interest on the first-mortgage bonds of the ship building company.

"But if we accept the figures given by the treasurer of the ship building company in the official statement made Dec. 24, 1902, to the New York stock exchange, the surplus current assets of the Bethlehem company, April 30, 1903, should be \$830,540.89, even after \$396,872.91 has been deducted for 'adjustments' (?), \$342,885.89 for new construction and charged to 'plant account,' and \$242,478.43 for depreciation of plant. What must impress the holders of securities of the ship building company most unfavorably is that these charges and appropriations were made with bankruptcy staring the ship building company in the face and against the protest made at the meeting of the executive committee of the United States Ship Building Co. on April 7, 1903, by the president, who earnestly appealed to the committee that they should not divert the funds of the company without providing for \$900,000 dividend which the Bethlehem Steel Co. had obligated itself to pay to the ship building company.

"Are not the first-mortgage bondholders more than justified in opposing the proposed plan of reorganization with these facts before them? If, after the ship building company came under the control and domination of one man, there had been a deliberate purpose to wreck the company and bring about the proposed reorganization, it could not have been more effectually pursued than by the course taken from the time when the original directors were forced to resign and new ones were designated by the Bethlehem Steel interests, through the period when the company's bonds and stocks were allowed to depreciate upon the stock exchange to such a point that banks would scarcely lend upon them, down to the publication of the Sheldon plan of reorganization which gave the company's credit an irreparable blow.

"We believe an investigation of the Bethlehem Steel Co.'s affairs will disclose some of the reasons for the extraordinary increase in the profits of the steel company and the apparent decrease in the earnings of all the ship building plants. It is admitted by the treasurer of the ship building company, after attempting to paint present conditions as black as possible, that the earnings of the eight ship building plants alone during the next year will be \$750,000, while the president of the company claims that, with an honest, disinterested and economical management, the earnings should be over \$1,500,000 in the same period, or twice the sum necessary to pay interest on the bonds. In the administration of the present receiver we will unquestionably have a management at once able and economical, so that there is reasonable hope that under the administration of the United States court the interest can be earned and paid on both the first and collateral second-mortgage bonds. The \$10,000,000 collateral bonds are secured by a mortgage on the Bethlehem Steel plant and a second mortgage of the ship building plants. A clause in this collateral mortgage

purports to give the holder the right to immediately foreclose in case of a default in the interest on our first mortgage, even if the interest on the collateral (or Bethlehem Steel) bonds is paid and the holder has signified his intention to foreclose under this illegal clause. An appeal will certainly be made to the court to prevent any such inequitable proceeding.

"Foreclosure under our own first mortgage cannot be made until ninety days after default, and if the holders of a majority of the bonds conclude to waive that default they have the power to do so. In the meantime, a thorough and impartial investigation will be made of all the company's plants, as to their physical condition, their need for betterments and additional working capital, and their earning power under conservative and economical management. With this data and information, it is believed that the committee can formulate a plan to be presented to the bondholders that will secure the additional working capital needed, prevent disintegration of the various properties (including the Bethlehem Steel Co.), and provide from the earnings sufficient to pay interest on an amount equal to the present indebtedness, or such smaller amount, equitably and proportionately reduced, as may be found necessary, thus giving fair consideration to all interests without subordinating the interests of the first-mortgage bondholders to the present second mortgage and without subjecting our bonds and stock to an arbitrary seven years' voting trust as contemplated by the Sheldon plan of reorganization. The first step towards the protection of the first-mortgage bonds having been accomplished, it should be followed up by concerted action on the part of all those bondholders who desire the various properties to be kept together and maintained as a going concern. Foreclosure is threatened and must be averted by prompt measures, or disintegration will set in. To best preserve all interests co-operation and unanimity of purpose is essential. To these ends your co-operation is invited."

Conferences were held between Receiver Smith, President Nixon and a committee of the minority bondholders and it was determined to fight foreclosure on the ground that it would mean the practical ruin of the corporation.

THE PERTH AMBOY SHIP YARD.

New York, July 22.—The Perth Amboy Ship Building & Engineering Co. of Perth Amboy, N. J., has acquired the services of Mr. Arthur Masters, naval architect of No. 29 Broadway, this city, as general manager. Since Mr. Masters' connection was effected the company has added to its facilities by installing an electric light plant of sufficient capacity to thoroughly light all its shops and yards, enabling work to be carried on day and night. Additions to machinery include a \$10,000 electrically-driven set of rolls, new punches, cold saws and joiner machinery. This company has one of the very best locations for ship building in the neighborhood of New York city, situate at the junction of Arthur Kill with Raritan bay. The depth of water at its docks is 40 ft. Present facilities will admit of the building of steel vessels up to 600 ft. length with plenty of ground space to enlarge in if necessary.

The Perth Amboy company now has on the ways in course of construction two harbor transports for the quartermaster's department of the United States army. They are sister vessels, 130 ft. in length, 27 ft. beam and 9 ft. draught, and are to have a speed of 13 miles an hour.

The schoolship *Young America*, about which a great deal has been written, is being built by this company. The construction of this ship has from various causes been considerably delayed. When her construction was undertaken the time set for her completion was July of this year, but as in all new enterprises unforeseen difficulties arose, probably owing in a great measure to the fact that the promoters of the enterprise knew a great deal more about navigating than building. Of course the construction of a vessel of this size—275 ft. length—requires more time, even under the most favorable circumstances, than most people are inclined to allow. However, work on the vessel is now being prosecuted with all possible dispatch and the date set for her completion is May 1, 1904. A peculiar feature about the *Young America* is that she is being constructed of steel imported from Germany. A question as to the reason for this brought out the answer that when the order for material was placed, not long ago, better and cheaper steel than could be found in this country, even after paying the heavy duty, was to be had from Germany, with more prompt delivery. Very probably the same conditions as to American and foreign steel markets do not now prevail, but a great deal of European steel has been used lately by Atlantic coast ship yards. This is a state of affairs of more or less interest no doubt to the protected steel organizations, suggesting the thought that they above all others should lend earnest support to any movement for the protection of our foreign-trade shipping.

G. W. R.

According to the newspapers some remarkable results were achieved by the submarine torpedo boats *Mocassin* and *Adder* on Saturday last. For a period of 32 minutes the *Adder* run submerged at a depth of 30 ft. She then rose to within 8 ft. of the surface and fired a torpedo at a target at a range of from 500 to 700 ft., it being a good line shot. The *Mocassin* was then put through a similar test and when submerged at a depth of 15 ft. fired a torpedo at a target at a range of 1,200 yds. It was an unusually fine shot and to the surprise of all it went through the target.



LONGSHOREMEN'S CONVENTION.

The twelfth annual convention of the International Longshoremen, Marine & Transport Workers' Association came to an end at Bay City on Saturday last. The convention was the most successful that the association has ever held. No opposition whatever developed to the re-election of President Keefe and Secretary-Treasurer Barter. The election resulted as follows: President, D. J. Keefe, Chicago; first vice-president, J. J. Joyce, Buffalo; second vice-president, A. Hackett, Lorain, O.; third vice-president, J. A. Gwynn, Galveston, Texas; fourth vice-president, J. McLaughlin, Sarnia, Ont.; fifth vice-president, L. Montmarquette, Montreal, Que.; sixth vice-president, R. W. Beach, Boyne City, Mich.; seventh vice-president, J. E. Porter, New Orleans, La.; eighth vice-president, J. E. Riordan, San Francisco; ninth vice-president, J. E. Woods, Jr., Jersey City, N. J.; secretary-treasurer, H. C. Barter, Detroit. President Keefe, Secretary Barter and T. B. Connor of Buffalo were elected delegates to the American Federation of Labor convention.

The distinguishing feature of the convention was the endeavor of the leaders to prove the virtue of moderation. President Keefe especially dwelt upon the value of conservatism and upon the absolute necessity of observing the strictest business principles. Although President Keefe was unable to prevail in his position to abolish absolutely the sympathetic strike, still he succeeded in minimizing its danger. None shall occur except where a majority of the delegates at a wage conference agree, and the international president and locals directly concerned shall determine whether a sympathetic strike be called.

The recommendations of President Keefe and Vice-President Joyce regarding closer relations with the Lake Carriers' Association and preference for vessels enrolled in that organization as against outside vessels were referred to the executive council. A conference of grain handlers will be held in Detroit one week prior to the meeting of the Lake Carriers' Association there in January, 1904.

President Keefe recommended the establishment of a federation of maritime interests, wherever feasible or practical, in order that all affiliated bodies might understand what their sister bodies were doing. A central body, he believes, would be productive of much good.

The executive council was empowered to consider the question of affiliating with similar organizations in other countries. The next convention will be held at Milwaukee.

CHICAGO GRAIN REPORT.

Chicago, July 22.—Grain freights have shown little if any change within the past week. The market has been quite dull. Rates hold firm on the basis of 1¼ cents wheat, 1½ cents corn and 1 cent oats to Lake Erie points, with rates to Port Huron and Georgian bay the same as to Buffalo. There is no demand for vessels to load Lake Ontario grain and rates are nominally on a basis of 2¼ cents corn. Shipments, lake and rail, are:

	Week just closed.	Last week	Same week last year.
Wheat, bu.	499,310	655,623	236,806
Corn, bu.	2,471,632	2,294,195	920,711
Oats, bu.	1,350,234	1,609,397	997,450
Total	4,321,176	4,559,215	2,154,967
	Since Jan. 1, 1903		Same time last year.
Wheat, bu.	11,691,763		15,060,102
Corn, bu.	44,335,995		19,533,450
Oats, bu.	36,476,695		30,025,366
Total	92,504,453		64,618,918

Some decrease is noted in the stocks of grain compared with last week, but stocks are still very much larger than they were a year ago. The stock figures follow:

	Week just closed.	Last week.	Same week last year.
Wheat, bu.	3,611,000	3,965,000	3,416,000
Corn, bu.	7,465,000	8,627,000	6,060,000
Oats, bu.	2,063,000	1,992,000	164,000
Rye, bu.	339,000	322,000	102,000
Total	13,478,000	14,906,000	9,742,000

Capt. W. J. Barnet, U. S. N., inspected the Dorothea, training vessel of the Illinois naval militia, after she had been overhauled by the Ship Owners' Dry Dock Co. of Chicago and has expressed himself as well pleased at the character of the work done on her.

CARGO RECORDS OF LAKE FREIGHTERS.

The Steel Corporation steamer Wm. Edenborn, one of the "big four" of the lakes, has again broken her own cargo record. She has held the honors in this regard for a long time past. This latest big cargo of ore, loaded at Duluth July 16 for Conneaut, footed up 7,780 gross or 8,714 net tons and was carried on a mean draught 18 ft. 8½ in. Cargoes of 7,000 net tons of hard coal were loaded at Buffalo recently by the Mitchell steamer W. E. Reis and the Tomlinson steamer Sinaloa, but these are not of a record kind as the steamer Isaac L. Ellwood, another of the "big four" that took a load of 7,668 net tons of coal out of Buffalo last season. The cargo records to date are:

Iron Ore—Steamer Wm. Edenborn, owned by Pittsburgh Steamship Co., A. B. Wolvin of Duluth, manager, 7,780 gross or 8,714 net tons, Duluth to Conneaut; steamer Isaac L. Ellwood, owned by Pittsburgh Steamship Co., A. B. Wolvin of Duluth, manager, 7,659 gross or 8,578 net tons, Duluth to Conneaut.

Grain—Steamer S. J. Murphy, Donora Mining Co., Duluth, 269,000 bushels of corn, equal to 7,532 net tons, South Chicago to Buffalo; steamer Douglas Houghton, Pittsburgh Steamship Co., A. B. Wolvin of Duluth, manager, 308,000 bushels of clipped oats and 60,000 bushels of corn, equal to 7,520 net tons, Manitowoc to Buffalo.

Coal—Steamer I. L. Ellwood, owned by Pittsburgh Steamship Co., A. B. Wolvin of Duluth, manager, 7,688 net tons anthracite, Buffalo to Duluth; steamer John W. Gates, Pittsburgh Steamship Co., A. B. Wolvin of Duluth, manager, 7,659 net tons of bituminous, Lorain to Duluth.

MAJ. KINGMAN'S RECOMMENDATIONS.

Maj. Dan C. Kingman, government engineer at Cleveland, has filed his annual report with the war department. A curious feature of the report is that he advises against the selling of the marine hospital property on the lake front. He thinks the government should retain it for its own uses. The property has been desired in the general plan for the grouping of Cleveland public buildings but Maj. Kingman believes that, if retained, it will become a valuable government asset. It has a water frontage of 700 ft. and Maj. Kingman's idea is to dig slips and to fill in until twenty acres of land have been created. This land, he estimates, should easily be worth \$40,000 per acre. This land, in his opinion, might become a general government rendezvous, a place where a lighthouse tender might be kept, where the government dredge could be moored, where the revenue cutters might anchor and where government tools and equipment might be stored. He suggests that two slips be built, each 150 ft. wide and 700 ft. deep with draught enough for the largest vessels. He also suggests wharves on each side of the slips which would afford the government 2,800 ft. of dockage. His estimate of the cost of the work is \$500,000.

CONSOLIDATED LAKE SUPERIOR CO.

In a review of the properties and prospects of the Consolidated Lake Superior Co., issued last week, President Cornelius Shields endeavors to show what has become of the millions invested. While the report does not openly criticize the former management it makes it clear that there have been extravagances and that some of the subsidiary companies have been run at a loss. President Shields makes no secret of the fact that there has been a cutting down all along the line and that more economies are to come. He indicates that the net earnings for the present year will be \$942,977. Of the ore properties, he says that the Helen mine, on the Michipicoten range, is the only ore property actually developed and the only one upon which the company can at present safely figure. The iron and steel plants and the Bessemer steel plants are reported in good condition. Vast sums of money have been put in the lumber and logging operations. The Sault Ste. Marie Pulp & Paper Co. has been losing money heavily. The fulfilment of a big contract with a Connecticut firm to take copper nickel is declared to be "surrounded with much uncertainty." The company's fixed charges are estimated at \$227,023, and the earnings at \$1,170,000.

Owners of lumber carriers are generally accepting from the Great Lakes Towing Co. the contract for towing their vessels at different ports around the lakes that was proposed by Mr. H. Coulby, president of the towing company, at a recent meeting of the Lumber Carriers' Association in Detroit. The Hines Lumber Co. of Chicago, which operates one of the largest fleets in the lumber trade on the lakes, has decided to make a season contract with the towing company, and it is understood that in all about 90 per cent. of the lumber tonnage has been covered by such contracts.

A SALVAGE CASE.

United States District Judge Wanty of Grand Rapids, Mich., has just rendered a decision in a salvage case, that of the steamer *Eliza H. Strong*. The award is small, but the case is interesting as are all salvage cases and especially as the greater part of the award goes to the crew of the salvaging vessel. A statement of the case and the decision as given out by the court follows:

The steamer *Eliza H. Strong*, bound for Buffalo, left Duluth Aug. 27, 1901, with a cargo of pine lumber, consisting of about 950,000 ft., 375,000 to 400,000 ft. of which was in the hull. It stopped at Washburn and picked up the schooner *Commodore*. At about 11 o'clock on the night of the 29th, the *Strong* sprang a leak, and in spite of all the efforts of the crew, the water gained on them so that the fires were put out and the deck load aft began to move, and the crew took to the small boats. Very shortly thereafter part of the deck load aft went overboard, carrying the cabin and smokestack with it. The crew boarded the *Commodore*, which sailed into Munising, arriving at about 2 o'clock the next morning. There being no night telegraph service at that place, and no tug stationed there, nothing could be done toward returning to the vessel that night, although this was the intent and purpose of the captain. About 9:30 o'clock in the evening of Aug. 30, the steamer *Mueller*, laden with a cargo of lumber from Ashland to Chicago, discovered the *Strong* in her damaged condition, with a part of her deck load gone and submerged aft but her bow still out of water. After ascertaining that there was no one on board, a boat from the *Mueller* manned by the mate, Louis Larson, and seamen Ralph Higbie and John W. Bonner, went to the wreck, and Higbie got aboard the *Strong* on the weather side, and the mate and Bonner boarded her from the lee side. These three men hauled a 9-in., 100-fathom line from the *Mueller* onto the *Strong*, and the two seamen held it while the mate chopped away the bulwarks and they then fastened the line around the stem and anchors of the *Strong*. The steering gear of the *Strong* was disabled, and as the men could do no good aboard of her, after making the line fast, they returned to the *Mueller*, which towed the *Strong* at the rate of $2\frac{1}{2}$ miles an hour to Munising bay, at the entrance of which, at about 9 o'clock in the morning, they met the tug *Smith*, having aboard the master of the *Strong* and substantially all the members of his crew. The *Smith* had been employed to go out and bring the *Strong* into Munising. The *Mueller* declined to give up the *Strong* but continued with her in tow and put her on the beach in soft mud, where she was protected from the sea and lay in security in possession of the members of the crew of the *Mueller* until the marshal took possession of her under process in this cause. The libel was filed claiming salvage in the sum of \$20,000, alleging the value of the *Strong* and her cargo to be \$40,000. William H. Strong, as master and bailee of the ship and cargo, claimed them, and under the order of the court an appraisal was made, placing the value of the steamer at \$4,500, and her cargo, consisting of 710,000 ft. of pine lumber, at \$5,977.20, making the total \$10,477.20.

The *Strong* was not derelict, although the master and crew had abandoned her for the time being in order to go to Munising for the purpose of getting assistance to save the vessel and cargo. The service, however, was a salvage service, although it is colored by the fact that the *Strong* would have been rescued by her own crew and the tug *Smith* within a few hours of her rescue by the *Mueller*, when the service would have been one of towage under contract, instead of one of salvage, under what the salvors thought was a case of derelict. The claimant objects to paying a large sum for a service which could have been contracted for at ordinary rates if the *Mueller* had not appeared on the scene, while the libelants object to having their work viewed in the light of ordinary service, and claim that it was an arduous and hazardous undertaking, requiring the exercise of great skill and daring, and that the *Strong* and her cargo might have found the bottom of the lake or the beach but for the timely assistance of the *Mueller*. But on a review of numerous cases, which it is unnecessary to cite, it would seem that the award should not be materially different on account of the ship being technically derelict or not. "Whether derelict or not the salvage award will not depend upon any fixed rule of proportion. It will be reached as in every other case of salvage—a generous recompense to the salvors, so as to encourage them and also to stimulate others. The service is the relief of property from an impending peril of the sea."—*The Eleanor*, 48 Fed., 842. It is easily conceivable that salvage might take place where the danger to property, the value of the property saved, the risk of life, skill, labor and duration of service required would be greater where the vessel was not actually derelict than in another case where it was. In either case the award should be based on the value of the property saved, the danger in which it was found, the risk of life and property required in the rescue, the skill and labor required, and the time lost in the service, together with the value of the means employed and risked.

In considering the question of the value of the property saved, I have come to the conclusion that the appraisal is about correct, although in the light of a successful voyage afterwards to Buffalo and the putting of the vessel in repair, the value of the vessel may now appear to be somewhat more, but that appearance comes from the successful issue of the undertaking to tow the vessel to Buffalo, and is based upon the cost of the repairs there. I find that the value of the *Strong* in her damaged condition and her cargo at the time she was beached was \$10,477.20. Taking into consideration all of the testimony in the case, it does not

seem to me that there was anything bordering on the heroic in rescuing this vessel. The fact that Higbie boarded the damaged ship on the weather side instead of approaching her on the lee side, where the mate and Bonner boarded her, and the holding of the line by the two seamen while the mate chopped away the bulwarks, would signify that the work could not have been so perilous as the argument of counsel might indicate. There was, of course, danger in boarding the vessel but not of that unusual character which would have deterred ordinary seamen from the undertaking. The *Mueller* was never in danger, as the only harm which could come to her would be the parting of the line, and thereby endangering her propeller wheel and steering gear, the danger of which was obviated by the slow rate of speed at which she handled the tow. The *Mueller's* expenses were \$60 a day and the service took $15\frac{1}{2}$ hours besides 3 hours longer to reach the course on which her voyage lay. As I have said above, the award in cases of this kind should not be made on the basis of a percentage of the value of the property saved, but should be fixed, under all of the testimony in the case, at an adequate amount covering the service rendered under the circumstances, and I fix the salvage award in this case at the sum of \$1,300. The mate and seamen have intervened and their proctor claims that the award should be divided by giving two-thirds to the crew and one-third to the ship, citing several cases in support of his claim. But on this branch of the case, as on the other, it seems to me that no hard and fast rule of proportion ought to prevail. It must occur to the least thoughtful mind that there are cases where the danger and work of the seaman might be trivial, and the expense to a great ocean liner in deviating from her course, delaying her voyage many days at enormous expense, would make the rule contended for by the intervenors most unjust. This award should be paid into the registry of the court and distributed as follows: \$500 to the owners of the *Mueller*; \$100 to the captain; \$100 to Larson, the mate; \$100 each to Seamen Higbie and Bonner; and the balance to the captain, mate and each member of the crew in proportion to the wages respectively paid to them. Let a decree be entered accordingly.

AROUND THE GREAT LAKES.

The Reid Wrecking Co. has purchased the tug *Aldrich* from Fowler & Smart of Port Huron for use in wrecking operations.

The schooner *Franz Sigel* foundered in a gale off Stony Point, Lake Erie, last Saturday morning. The crew took to the rigging and were later taken off by the government survey boat *Gen. Williams*.

Mr. Harvey D. Goulder, who has been in Europe for some time past, will sail for home on the *Campania*, Aug. 8. Congressman Burton, with whom Mr. Goulder spent most of the time abroad, will not return for several weeks.

The tug *Boscobel* recently towed down to the head of the St. Clair river a raft for the Cleveland Sawmill Co. that contained 8,000,000 ft. of lumber. The raft was so large that it was found necessary to split it in sections for passage through the rivers.

The steamer *Waverly*, belonging to the Gilchrist fleet, was sunk in collision with the steamer *Turret Court* 5 miles below Harbor Beach, Mich., on Wednesday. It is claimed that the wheel chains of the *Turret Court* parted when the vessels were close together and before anything could be done the *Turret Court* had crashed into the *Waverly*. The *Waverly* was built in 1874. She had on board a cargo of coal.

In six months ended July 1 the Sheriffs Mfg. Co. of Milwaukee booked orders for eighty-three propeller wheels. In one day this week the company shipped to Chicago a wheel of 9 ft. 10 in., one of 9 ft. 6 in. and one of 8 ft. 10 in. This company will soon reach the twenty-three-hundred mark in wheels made. Its business has been very good for several years past, as the average number of wheels shipped per year for the past five years is 140.

The thing which Lake Michigan interests are now looking forward to is the race between the City of South Haven, owned by the Dunkley-Williams Line, and the *Eastland*, owned by the Michigan Steamship Co. The brush was expected one day this week but the firemen of the *Eastland* deserted her without warning and the race consequently did not come off. Undoubtedly it will occur one of these days because these two boats could not even meet each other in the lake without a contest of speed—at any rate not so long as the question of supremacy is in doubt.

Capt. J. H. McLeod, who sailed the lake steamer *H. B. Tuttle* a few years ago, has been distinguishing himself in the Philippines. After leaving the lakes he went to China, returning during the Spanish war and going to Cuba. On account of the war conditions he met with advancement in the United States revenue cutter service, which he joined after his return from China, and is now in command in the Philippines of the coast guard steamer *Palawan*, which is one of the vessels of the so-called Philippine navy. The *American*, published in Manila, tells of an encounter which Capt. McLeod had with outlaws on one of the islands recently while landing a detachment of native scouts. "The captain cleared ship for action," says the *American*, "and turned the scouts loose upon the malcontents. The party on shore were fairly well entrenched and made a determined effort to oppose the landing, but Uncle Sam's forces handled themselves well and the outlaws' losses were heavy. The landing party was protected by a well-directed fire from a detachment that remained aboard the vessel. When the scouts gained the beach they found twelve of the enemy dead and the shore lined with wounded. Two of the scouts were wounded, one fatally."

SUCTION DREDGES FOR THE GREAT LAKES.

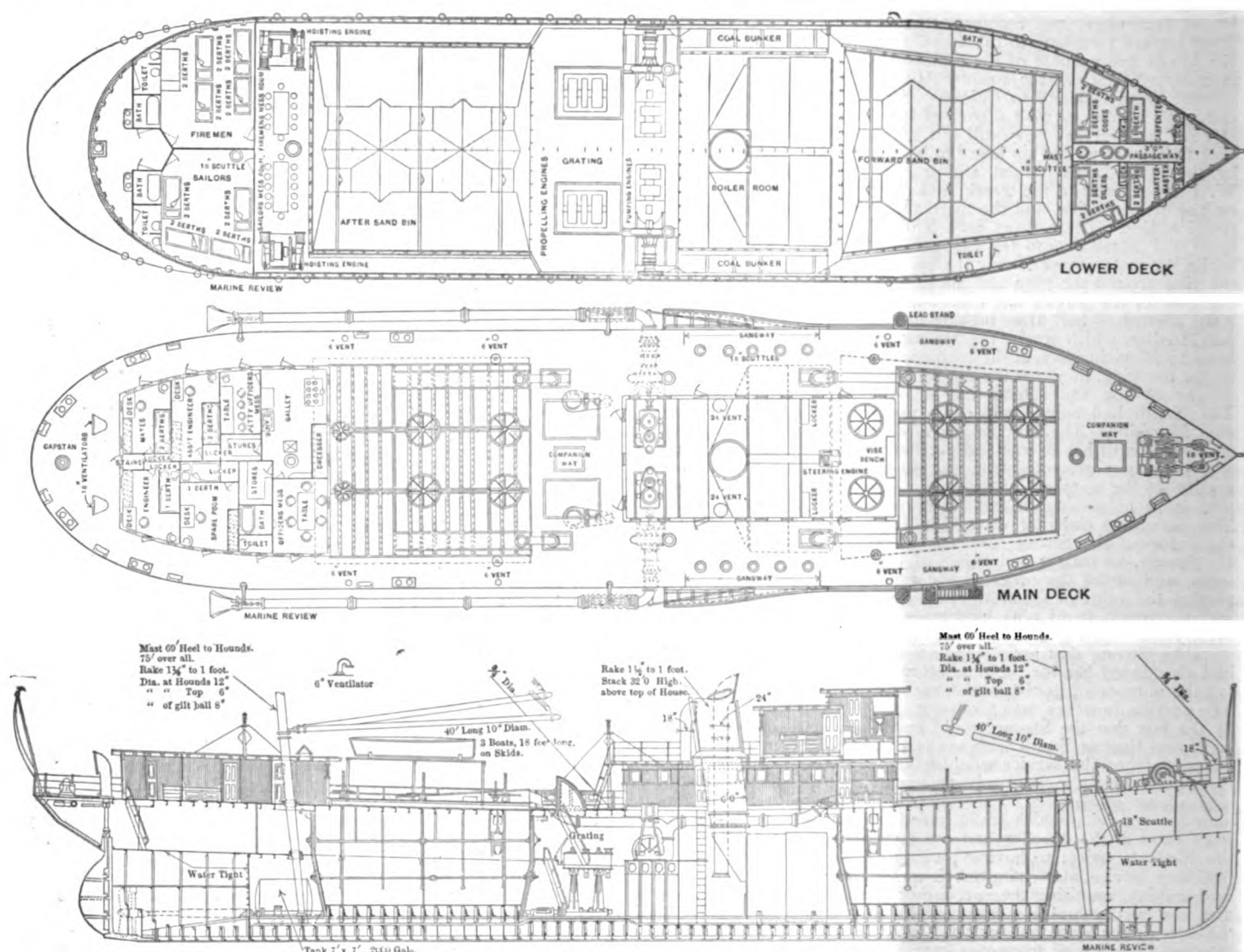
Bids were opened on Saturday last by Capt. J. C. Sanford, government engineer at Philadelphia, for two suction dredges for service on the great lakes—one for the Cleveland district and one for the Milwaukee district. The Maryland Steel Co., Sparrow's Point, Md., was the lowest bidder and will very probably be given a contract for both dredges. This still further increases the large amount of work already on hand at the Sparrow's Point yard, but with a good organization and fine equipment the orders will undoubtedly all be well taken care of. The Lake Erie dredge will be under the direction of Maj. Dan C. Kingman and the Lake Michigan dredge under the direction of Maj. J. G. Warren. Both dredges have sea-going qualities and are constructed of steel. They are of the following dimensions: Length between perpendiculars, 166 ft.; length over all, 177 ft.; molded beam, 38 ft.; molded depth, 19 ft. Construction is to conform to the rules of the American Bureau of Shipping. The hull is to be subdivided

pound, condensing type with cylinders of 12 in. and 22 in. and stroke of 14 in., and built for a working pressure of 125 lbs. per square inch. The suction pipes are to be of 15 in. inside diameter.

Each dredge will have two masts of Oregon pine, 75 ft. high and fitted with all necessary iron work and rig. Each is to be fitted with a Hyde combination steam and hand windlass, a Hyde steam capstan and a Williamson steam steering engine. The pilot house, captain's and inspector's rooms are to be fitted in oak and cherry and to possess conveniences of a thoroughly modern order.

MR. COULBY ON TRADE AGREEMENTS.

Mr. H. Coulby of Cleveland, well known in iron ore and vessel circles, has taken a leading part for three or four years past in representing employers of the lakes in their dealings with the dock laborers and the men engaged aboard vessels. The July bulletin of the National Civic Federation contains short articles



Longitudinal Section and Deck Plans of Suction Dredges for the Great Lakes.

by watertight collision bulkheads, extending to the lower deck only on frames 9 and 73 and a bulkhead on frame 41 with a door in it to permit access. The coal bunkers, two in number, are to be located on each side of the boilers. The dredges will be equipped with two sand bins, the forward one extending from frame 13 to frame 29 and the after bin from frame 52 to frame 68.

The propelling machinery will consist of two vertical, inverted, direct-acting, jet condensing, fore-and-aft compound engines, with cylinders of 15 and 30 in. diameter and common stroke of 24 in., each driving a four-bladed cast-iron propeller 7 ft. 6 in. in diameter and of 12 ft. pitch. Steam will be supplied by two Scotch return-tubular type boilers, 13 ft. diameter and 12 ft. long, allowed a working pressure of 125 lbs. and having three 40-in. corrugated furnaces each.

The dredging pumps are to be 15 in., of centrifugal type, especially adapted for dredging, the blades to be covered with renewable steel plates for their entire working surface. The depth of the blade is to be uniform and to pass in easy curve from suction inlet to the periphery. The number of revolutions of the discs of these pumps is to be between 200 and 250 per minute and the pumps shall be capable of raising and discharging, against a total head of 14 ft., 60 cu. yds. of water per minute. The pumping engines are to be two in number directly connected to the 15-in. sand pumps. They are to be of the vertical, inverted, com-

from employers in different parts of the country on the subject of trade agreements, and among them is one from Mr. Coulby, who says:

"The dock managers of the great lakes are now entering upon their fourth year of dealing with the longshoremen by the contract system and I have no hesitation in saying that it has been, on the whole, satisfactory to both the managers and the men. In fact, the results have been such that the Lake Carriers' Association has this year, for the first time, made contracts with the firemen, water tenders and oilers, with the seamen and with the cooks. The Great Lakes Towing Co. has also just entered into contract with the Licensed Tugmen's Protective Association and the tug firemen and linemen's organization for manning their tugs during the ensuing year. All of these contracts contain the usual arbitration clause and provide that the men shall continue at work pending such arbitration. In addition, it is provided that all men working under the contracts must be satisfactory to and under the direction and control of the management, which I regard as the most essential features of the contract, because it clearly defines the relation between employer and employee. The officers of the International Longshoremen, Marine & Transport Workers' Association were the pioneers in establishing the contract system on the lakes, and to them is largely due the success that has attended its adoption. They have always insisted that a

contract once entered into must be lived up to conscientiously and faithfully.

"I believe the supply of labor on the great lakes is nearly all included in the several unions. Just so long as labor leaders keep up their supply of labor to fill the trade agreements they enter into, insist upon the elimination of sympathetic strikes and insist also that all matters in dispute be submitted to arbitration, the men in the meantime continuing to work, and that they shall not encroach upon or interfere with the executive part of the work, I believe satisfactory results will be obtained for both sides through trade agreements. It is certainly a vast improvement over the old method, which often resulted in strikes and interruptions two or three times a month.

"The sociological problem of the ultimate outcome of the exclusive employment of union workmen, coupled with the system of trade agreements, must, in my judgment, remain for the present a tentative one. A student of the history of trades unions in England for the last century finds its pages filled with things that dwarf commercial development. To successfully apply this method of dealings between employer and employe entails responsibilities on both sides. The employer must recognize that while all men are not endowed with the same ability we are all human and entitled to fair treatment and that the best results are always obtained from men who feel they are well treated. At the same time he must jealously guard his right to run his own business in his own way, as there is a tendency in unions to encroach upon the executive part of the work. On the other hand the trade unions must recognize the right of every man living under our form of government to sell his labor in the best market he can find, to rely upon the power of moral suasion and example to recruit their ranks and eliminate from their creed the weapons of boycott, tyranny and oppression that seems in the past to have been part of their stock in trade."

CONSOLIDATED LAKE SUPERIOR BONDS.

Shareholders have received formal notice of the offering of \$12,500,000 new 30-year 4 per cent. collateral trust bonds by the Consolidated Lake Superior Co., which recently became involved in financial difficulties. The bonds are offered to subscribers at 60, this low price furnishing a good illustration of the present condition of the bond market. The bonds will net the investor something like 7 per cent. Subscriptions will be received at the rate of \$1,000 of bonds for each eighty shares of common and preferred stock. The proceeds will be used in connection with the payment of a loan of \$5,050,000 negotiated with Speyer & Co., and \$2,450,000 for the discharge of current indebtedness, chiefly on construction accounts and for working capital. The circular to the stockholders reads in part as follows:

"These bonds will be secured by the stocks of all subsidiary companies of the Consolidated Lake Superior Co. and by mortgage bonds of these subsidiary companies. The property thus pledged as collateral represents a cash investment of more than \$25,000,000 in completed undertakings that are now either operating profitably or ready for operation. Stockholders will have the right to subscribe for these bonds in the proportion of \$1,000 of bonds for each eighty shares of either common or preferred stock, payment for the bonds to be made at the rate of \$600 for each bond of \$1,000. Negotiable warrants specifying the amount of bonds to which each stockholder will be entitled to subscribe will be mailed to stockholders of record at the close of business on July 20, 1903. Warrants for less than eighty shares may be combined to make the amounts required for subscription to even amount of bonds. Subscription for bonds will be received on behalf of the company from July 21 until and including Aug. 10, 1903, by the Commercial Trust Co., Philadelphia; Morton Trust Co., New York city; National Trust Co., Ltd., Toronto. Terms of payment for the bonds will be as follows: Twenty-five per cent. upon subscription, 25 per cent. on Sept. 1, 1903, and 50 per cent. on Sept. 15, 1903. Negotiable receipts will be issued for payments pending the delivery of the bonds. Such bonds as shall not have been subscribed for by stockholders on Aug. 10, 1903, will be disposed of otherwise by the board of directors; but not at a price lower than that at which they are offered to the stockholders. The proceeds of the sale of the present issue of \$12,500,000 of bonds will be used as follows: For repayment of temporary loans, \$5,050,000; for the discharge of current indebtedness, chiefly on construction accounts, and for working capital, \$2,450,000; total, \$7,500,000.

"The estimated net earnings of the company for the year beginning July 1, 1903, figured upon a most conservative basis, will amount to more than \$900,000, while the interest on the present issue of bonds will be only \$500,000."

OPPOSING CANAL ENLARGEMENT.

Interests in New York state opposed to the enlargement of the Erie canal so as to admit of the passage of 1,000-ton barges have certainly been very active of late and the prospects of the new canal scheme going through are not as bright as they were a short time ago. The opponents of the canal project succeeded in interesting the New York State Grange in the Rochester mass convention called to protest against the canal improvement and a great effort is being made to convince the farmers that their taxes will be increased without benefit in the slightest degree. The argument to the farmers is that they get no benefit from the canal; that the \$9,000,000 expenditure of some time ago for alleged improvement of the present canal was a wanton waste and

that the \$101,000,000 asked for the 1,000-ton barge canal will be equally barren of results. They are told that not only are they to be taxed now for the construction of the waterway, but that they are to be perpetually taxed for its maintenance, as it is to be free of all tolls. The New York Central Railway facilitated the attendance of farmers along its line at the Rochester convention by making half-fare rates.

In New York and Buffalo and in the cities and towns along the line of the canal the objectors are making another kind of argument. The barge canal is declared to be too small to compete successfully with the Canadian route and with the proposed connections between the lakes and the Ohio and Mississippi rivers that would make a continuous waterway to the Gulf of Mexico. It is also claimed, as of old, that what is wanted is a deep-water route to enable ocean-going vessels to take their cargoes at the head of the lakes and carry them through to tide-water; and such a waterway, it is said, may be made for less than double the amount required for the 1,000-ton barge canal. Even government control of the state waterways, which it is claimed will lead to a ship-canal, is held up to the voters in preference to the present project. Of course all these arguments have many times been answered by the advocates of the barge canal. The railway managers, who object of course to any kind of waterway improvement, are discreetly keeping silence, but their support is undoubtedly given quietly to the other objectors.

CANADIAN SHIPPING NOTES.

Kingston, Ont., July 22.—The Shipping Federation of Canada has been incorporated by an act recently passed by the Dominion parliament. The object is to associate together the various shipping interests throughout Canada for mutual protection and benefit. Those interested are connected with ocean-going vessels and reside in Montreal. The provisional council for organization purposes consists of H. A. Allan, W. I. Gear and J. Thom. It is understood that the federation will deal with matters affecting ocean-going trade only, leaving the Dominion Marine Association, lately organized to promote the inland marine interests. Membership in the latter organization is increasing quite rapidly from all the provinces of the Dominion. To June 30 there had been enrolled thirty-two firms or companies owning 109 steamers and eighteen barges or schooners, while three firms had enrolled but had not declared the tonnage owned.

The Vancouver Tourists' Association proposes to raise the steamer Beaver, which was wrecked off Vancouver in July, 1888, and maintain her as a relic. The Beaver was built on the Thames, England, in 1835 for the Hudson Bay Co. and reached the coast in April, 1836, being the pioneer steamer in those waters.

Business men of Sault Ste. Marie, Ont., are still complaining that a number of the Canadian steamship companies continue to use the United States canal in passing to and from Lake Superior and do not touch on the Canadian side, notwithstanding the endeavor to provide all kinds of facilities for them.

A company has been registered in Victoria, B. C., with a capital of \$70,400 to acquire the steel barque Lord Templeton of Victoria, B. C. The Lord Templeton was built at Belfast, Ireland, in 1886, and has a registered tonnage of about 2,000.

The Thousand Islands Steamboat Co.'s St. Lawrence is under repair here. Her machinery and upper works were damaged by the breaking of the walking beam while she was running at full speed.

The Oakville Navigation Co. has chartered the steamer Niagara for the remainder of the season in place of the burned steamer White Star. It has not yet been decided whether the company will build or purchase a new vessel.

The Imperial Fish Co. of West Selkirk, Man., has just had built on Lake Winnipeg a steamer 135 ft. 10 in. over all, 25 ft. beam and 8 ft. 10 in. depth.

The Northern Navigation Co. of Collingwood has under consideration a proposal to build a passenger steamer exclusively for the local excursion trade out of Collingwood or other ports on the south shore of Georgian Bay.

The North Vancouver Ferry & Power Co. has acquired the steamer Mermaid and has placed her on a route between Vancouver and North Vancouver, B. C.

PROPOSED ST. LAWRENCE RIVER DAM.

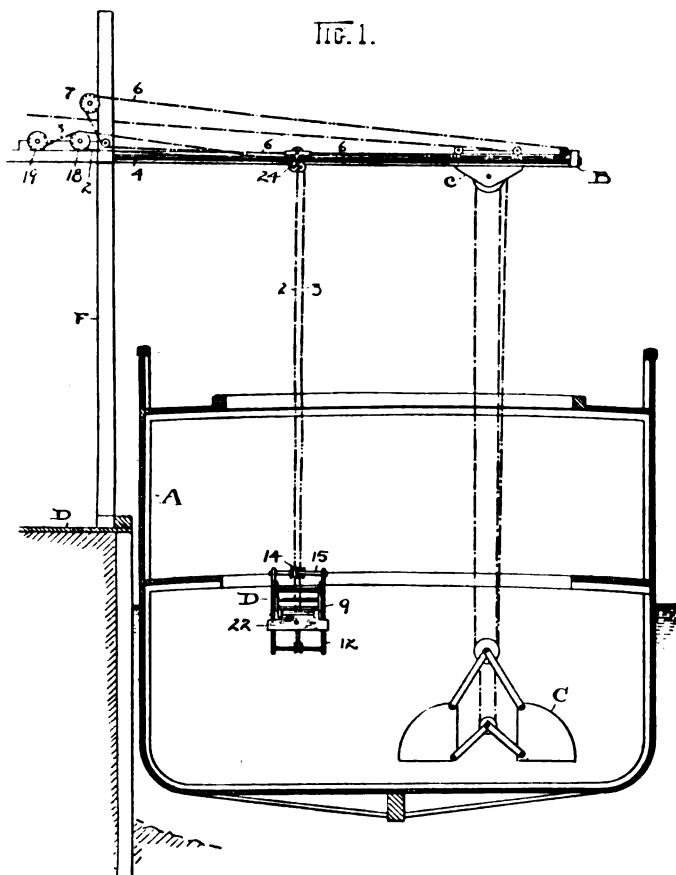
Major Theodore A. Bingham, United States engineer at Buffalo, announces that pursuant to an order of the secretary of war, a public hearing will be held at 10 o'clock A. M. Aug. 11, 1903, in the United States court room, Custom House building, Ogdensburg, for the purpose of determining whether or not the type of a proposed dam across the gut channel of the St. Lawrence river between Les Galops island, New York, and Adams island, Canada, and the plans of construction and operation of the proposed dam will materially affect the water level of Lake Ontario and the St. Lawrence river, or cause any other injury to the interests of the United States or any citizen thereof. All facts and arguments must be submitted in writing, although oral discussion is also desired.

Interest centers in the new steamer James H. Reed, built at Detroit and which is now making its maiden trip. This steamer has its hatches spaced 12 ft. centers and has more of them than any steamer in commission. As far as her deck arrangement is concerned everything has been done that can be done to facilitate loading and unloading. It will be interesting to note whether the clamshells can beat their record on the Hoyt.

ANOTHER TYPE OF ORE SCRAPER.

Samuel E. Leonard, manager at Ashtabula, O., for the Great Lakes Towing Co., has patented a scraper attachment for hoisting apparatus used in unloading ore carriers. In accordance with the usual custom of having patent specifications as broad as possible, the Leonard device is said to be useful in the handling of all kinds of coarse freight, but it is especially designed as an adjunct to the clam-shell hoist now coming into general use on docks of the lakes where iron ore is unloaded. Its purpose is to draw the ore from the sides of the vessel to the center, under the hatch openings, so that it may be readily picked up by the grab buckets. Fig. 1 among the drawings is a cross-section of a vessel and an elevation of the scraping attachment with a bucket shown in connection therewith. Fig. 2 is a side elevation of the scraper with a cross-section of a portion of the vessel and the supports and operating means for the scraper shown more or less in outline. Fig. 3 is a perspective of the scraper and Fig. 4 is a plan view of Fig. 1.

Of course the use for a scraper in connection with grab buckets comes from the fact that a bucket of this kind can only work beneath the hatch through which it is lowered and has no means whereby freight lying beyond the grasp of its wings can be reached. Hence there is always involved much expensive hand labor for working the freight from the sides and between hatches

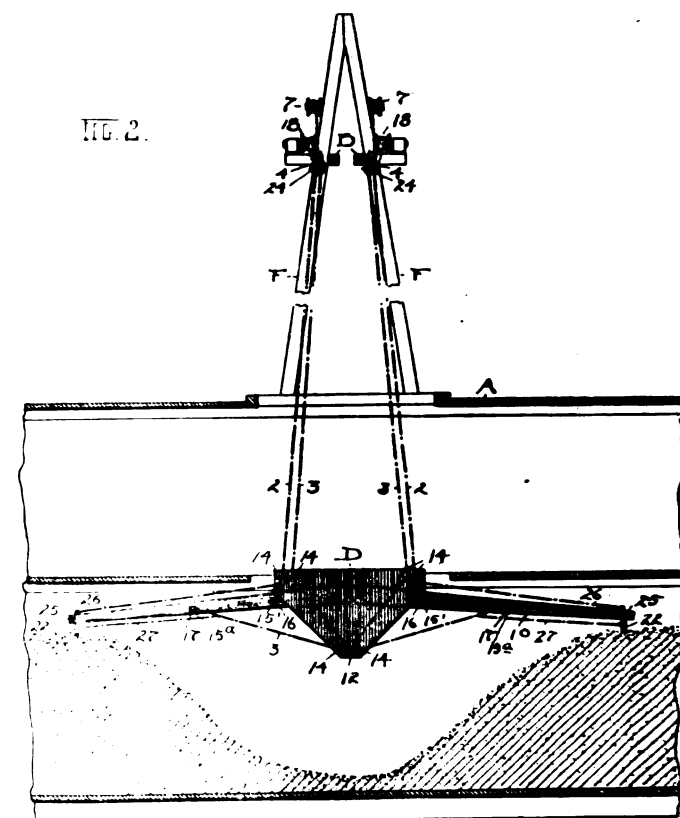


to a point within the range of the bucket. The Leonard patent specifications are made to cover the hoisting apparatus as well as the scraper and the whole device is thus described:

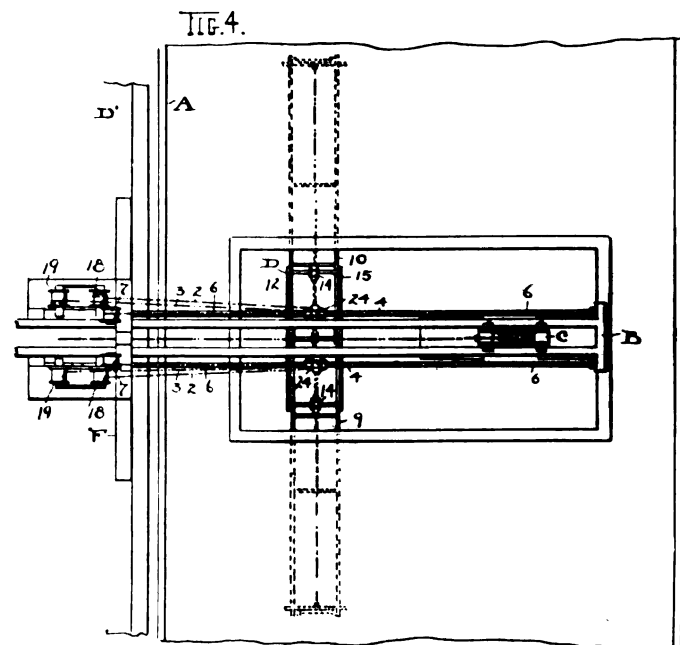
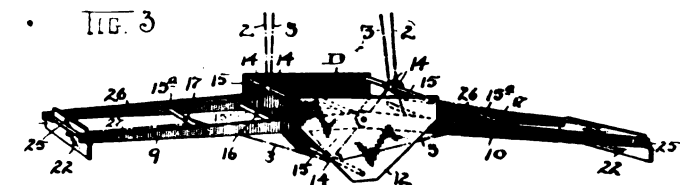
"It comprises a suitable upright support or frame F of such elevation and strength as the work may need and which stands firmly or is erected upon the dock D', where unloading of the vessel or boat A takes place. Any suitable structure, fixed or movable, may be employed as this frame. Upon the said frame or supporting structure F is a boom B, much as usual, which is adapted to reach over the boat or vessel and which carries the bucket C and the scraper mechanism aggregated under designation D. The bucket C and mechanism D are operated in different vertical planes, but may come into close working relation at times. Both are operatively suspended from the boom B, and both are adapted to be operated therefrom through suitable cable or rope connections.

"In this description it is assumed that the bucket C is of well-known pattern and is supported and operated in a well-known way, having a small carriage c on the double track of the boom B, from which it is suspended by ropes or cables, and with sheaves here and there as may be needed to operate the same. The scraper D is suspended by cables 2 and 3 from rods, bars or tracks 4 at the sides of the boom, and the scraper is suspended and operated from these by the two cables 2 and 3, while cable 6 serves to fix the scraper in one position or another back and forth on the boom or on rods 4 thereon, according to the working position wanted in any given case. A drum 7 is provided, through which this cord or cable is controlled by power from the engine. (Not shown). The scraper itself comprises two wings or sections 9 and 10, pivoted at their inner ends on a central frame 12 of any suitable kind or construction and which carries sheaves 14 here and there over which the cables or cords 2 and 3 run and

are supported. Cross rods 15 connect the sides of frame 12, and some or all of the said sheaves 14 are or may be supported on these rods. Cable 2 passes down and is affixed on one of the upper or inner cross rods 15' at a point 16, while cable or cord 3 passes down over two sheaves 14 and engages one of the outer or



lower rods or rounds 15' at 17. Each cable 2 and 3 has its own drum 18 and 19 respectively, over which it is wound, and the corresponding cords of the two wings have drums 18 and 19 respectively. Thus cables 2 for said wings go to drum or drums 18 and cables 3 go to drum or drums 19, and these drums also



and obviously are power-controlled from the engine; but the connections therewith are not shown.

"Now in operation the rotation of drum 18 alone will bodily raise the scraper with the wings spread or folded, as may be, and drum 19 controls the closing and opening of the wings. If they be lowered to working position and spread for work, as in Fig. 2, the said wings can be drawn forcibly toward folding position by suitably turning or winding drum 19. Then and in this manner

they do their work, having each a suitable scraper blade 22 to engage in the material and being both drawn toward the center and in a large measure held down to work by the weight of the scraper. However, while this drawing together of the scraper is going on, drum 18 should be turned enough to take up all slack in cables 2, and the scraper is designed to be controlled by or through the said drums and cables in the entire operation of the scraper, and perfect control thereof is afforded by these means. Suitable hangers 24, with sheaves, are engaged on side rods 4, over which the cables 2 and 3 travel and are suspended. The mechanism for controlling the scraper is so placed on the boom as not to interfere with the operations of the bucket, and as already indicated, both scraper and bucket are suspended from the boom and operated therefrom as well. The scraper blade 22 is supported to swing on a cross-shaft 25, mounted at the end of the wing arms, and the top of blade 22 has a cable 26 attached thereto which connects with cable 2. A cable 27 is attached to blade 22 below shaft 25, which cable connects with cable 3."

NECESSITY FOR FAST COALING VESSELS.

At the summer meeting of the Institute of Naval Architects in Belfast recently, Mr. E. H. Tennyson D'Eyncourt read a paper emphasizing the necessity of providing specially designed fast coaling vessels to accompany British squadrons when traveling at a high rate of speed and to supply them with fuel without delay. The government, he said, had no doubt considered the question of building some such vessel as he proposed, and some barges had actually been built which can be towed about and have all the necessary appliances for dealing expeditiously with a cargo of coal. These barges carry about 1,000 tons. Some much larger vessels of a similar character, but with a capacity of about 10,000 tons of coal, were, he believed, now under construction. These vessels, however, like the smaller barges, or "coal haulabouts," as they were termed, had no means of propelling themselves, and could only be moved about very slowly by towing, but the above-named type of vessel would doubtless prove exceedingly useful, and help to hasten the process of coaling our warships in the close neighborhood of the coaling station or depot to which they belong; but though in this way they might prove of great service, these "coal haulabouts" lack that most vital necessity in time of war, mobility. It therefore appeared essential that the British navy should possess a sufficient number of vessels capable of maintaining a sea speed of 17 knots, and to do 18 knots in case of an emergency. If Britain could achieve this, a great deal would have been done towards increasing the efficiency of the navy. The various requirements could be met by vessels of approximately the following dimensions: Length, 550 ft.; beam, 66 ft.; draught of water, 27 ft., with 10,000 tons of coal on board, so as to be able to go through the Suez canal with full coal. They would consume less than 1½ lbs. of coal per horse power per hour, so that at full speed the collier could go 1,000 miles from the coaling station and back on 800 tons of coal, carrying 10,000 tons of coal to the fleet. That is enough to coal five of the largest battleships or cruisers. Any one of the large cruisers or armorclads would take four or five days to go the 2,000 miles, would use at least 1,000 tons of coal, and would have been steaming hard all the time, arriving with dirty boilers and a tired complement of stokers, etc., and a great part of her coal already burnt. Possibly 1,000 miles from the coaling station is a long way to assume, but the same thing is true for a shorter distance only not to such a marked extent. The cost of each of these colliers, fully equipped with Temperley transporters and all the necessities for quick coaling, would be about £270,000, so that four or five could be had for the cost of one first-class armorclad or cruiser, and the four could be kept in commission for about the cost of keeping an armorclad. In time of war each would be an asset equal to several additional warships, as they would enable so many warships to remain at sea, saving them time of going to and fro for coal, and giving them time to clean their boilers, do minor repairs to the engines, etc., besides resting the whole crew, officers, and men. It would, no doubt, be possible to make such colliers suitable for carrying troops, fresh water, and consumable stores, provisions, etc., other than coal, but to attempt this would spoil them as colliers, and these duties could well be carried on by other mercantile vessels, as the warships would probably not require those other commodities nearly so frequently as coal.

In the discussion which followed, Mr. C. MacRow, director of the Thames Iron Works, said the conference was indebted to the reader of that valuable paper. Members of that institution very often did the government good service by exerting a little outside influence, which was much needed. Admiral Cleveland disagreed with the proposals contained in the paper, because he believed coal would not very long be the fuel of our ships. He thought oil would soon be adopted, as had been the water-tube boiler, and that, under the circumstances, the government would be ill-advised in embarking upon so heavy an expenditure as had been suggested. Prof. Biles thought the general tendency of the proposal seemed to be rather in the wrong direction, from an economical point of view. The navy was a necessary evil, and all of us hoped that it would never be brought into use. Therefore, anything that added to its unproductive part seemed economically unsound. The paper opened up a new field for the application of mercantile ships to cruiser purposes, and in this respect was well worth considering.

The Manitowoc Dry Dock Co. is to build for the Milwaukee Tug Boat Line a steel tug of 87 feet length and 21 ft. beam.

COST MORE TO BUILD SHIPS.

Alexander R. Smith in the New York Sun.

A great many people wonder why it is that it costs more to build a ship in the United States than it costs to build one in Great Britain, for instance, and a letter published in the London Times of July 7, over the name of "An Ulster Workingman," and written from Belfast, Ireland, where the great ship building plant of Harland & Wolff is located, may shed some light on the subject. Permit me to quote from the letter in question:

"A fellow workman and I were in receipt of 30 shillings per week each some time ago. My fellow workman decided that he would abandon his country and the flag and go to a country that would do better for him, so he went to the United States of America and received 60 shillings per week right off. When he was in this country, at the wage of 30 shillings weekly, his expenditure was 27 shillings, which left 3 shilling of a margin; now, while his wages have increased by double the amount he received when in this country, he assures me that his expenditure has increased by only one-third, thus:

"In this country his receipts were 30s. weekly.....30s.	"In the United States of America his receipts are weekly60s.
"His expenditure was, weekly27s.	"His expenditure is, weekly.....36s.
"Margin of saving power weekly 3s.	"His margin of saving power, weekly24s.

"Or, in other words, for every shilling he used to save in this country, he can now save eight shillings in the United States, besides having better educational facilities provided for his children."

There is much more of interest in the letter quoted, the writer asserting that British workmen "are, without doubt, the finest and most intelligent men in the world," on which account he says "they should receive the highest wages," and he asks free traders to tell him why British workmen don't receive the highest wages.

The wages the Ulsterman gets, however, explains why it is that Great Britain is able to build ships from 25 to 30 per cent. cheaper than this country can build them. Free traders in the United States desire that the economic conditions prevailing in Great Britain, as explained by the "Ulster Workingman," shall obtain here, so that we can build ships here that will enable their owners to compete with British ships in the foreign carrying trade of the United States. American protectionists, on the other hand, are willing that wages in the United States shall remain double those in Great Britain, but those interested in shipping ask that the protection which our industries enjoy upon the land shall be extended to our ships in the foreign trade, so that our workmen, both on land and on sea, shall enjoy the American standard of wages. This difference in the wages paid to American workmen in our ship yards and on board of our ships, as compared with the wages paid in British ship yards and on board British ships, fully explains the need in the United States of protection if American workmen are to build, and American citizens are to run the ships our foreign commerce employs.

If we wait for free trade, and wages for American workmen on a level with those paid to the "Ulster Workingman," instead of holding fast to the wages his former chum, now an American citizen, receives, some day in the dim future we may build our own ships; but the American people—and especially the American workingman—should know what it is that holds us back from building our own ships, and I hope that the Sun will let the "Ulster Workingman" explain it to them, as above.

NEW BRITISH CHARTS.

New charts, recently issued by the hydrographic department of the admiralty and on sale by J. D. Potter, chart agent, 145 Minories, London, are:

- 3353. Tidal streams, Channel islands, twelve charts bound together.
- 3315. England, south coast—Straight point to Portland.
- 3302. Scotland, west coast—Narrows of Raasay and Caol More.
- 3331. Scotland, Hebrides, west coast—Flannan isles or Seven Hunters. Sulisker. North Rona.
- 3319. North American lakes—Goderich to Chantry island.
- 1465. South America, east coast—Sao Sebastiao island to Bom Abrigo island.
- 3336. Aleutian islands—Unimak and Akutan passes and approaches.
- 395. Africa, west coast—Isles de Los, Konakai road.
- 3347. Japan—Plans on the north coast of Nipon.
- 2035. New Zealand, north island—Coromandel harbor.
- 3338. Pacific ocean, Gilbert islands—South part of Nonuti.
- 2221. Black sea, plans of Russian ports on the north shore—Added plan of Gagri anchorage.
- 2220. Black sea, ports and anchorages on the south shore—Added plan of Kerasunda.
- 1535. Plans on east coast of Iceland—Added Horne fiord entrance.
- 1806. Africa, west coast, Great Fish bay to Walfish bay—Added plan of Sdvakopmund road.
- 2662. Celebes, ports in Makassar strait—Added new plans of Menjene road and Balangnipa road.
- 769. Admiralty and Hermit islands—Added plan of Carola bay; new plan of Hermit islands.

UNITED KINGDOM'S SHIPPING.

There has just been issued in London a voluminous report entitled "Annual Statement of the Navigation and Shipping of the United Kingdom." The subject dealt with is the ocean carrying trade of the United Kingdom, a trade which embraces not only the export and import business of the country proper but also the transshipment transactions and the coastal traffic between the various ports of Great Britain. The figures given, voluminous as they are, apply only to the number, tonnage and nationality of the vessels engaged in this trade and do not directly indicate either its volume or value. Even with these limitations they are to some extent misleading because they include as British a number of American-owned vessels—notably those acquired by the Morgan combine, which are not actually now a part of the British merchant marine. This consideration applies, however, only to American vessels, as ships acquired by other nationalities are quickly transferred to the flags of the purchasing nation. Making allowances for these defects in the statistics the conclusions are still favorable to the vitality of British carrying trade. The report says:

"A glance at the following figures, showing the total net shipping tonnage of our foreign trade both inward and outward for the past three years, will suffice to demonstrate that in this period, at least, there has been no retrogression.

Description.	1900. Net tons.	1901. Net tons.	1902. Net tons.
British vessels	62,710,836	62,789,841	64,902,907
Foreign vessels	35,812,857	34,561,172	34,909,812
Total	98,523,693	97,351,013	99,872,719

"We have here not alone a considerable increase in the total tonnage to the credit of last year, but also a continuous progression for the last three years in the proportion of British vessels engaged in this trade. As compared with 1900 the last year shows an increase of 2,192,000 tons in the British shipping handling our foreign trade and a decrease of 843,000 tons in the foreign shipping the British percentage having risen from a little over 63 to nearly 65 per cent. No doubt if last year's American transfers were allowed for, the improvement would be less marked; but the margin is still considerably more than sufficient to cover the Morgan acquisitions, and, apart from these, it is clear that foreign competition has made no progress in recent years, so far as the carrying of this country's ocean traffic is concerned.

"Of only secondary interest to the general apportionment of the carrying trade between British and foreign bottoms is the relative distribution of business between the various great ports of the United Kingdom. The reorganization of the port of London, which is now only a question of time, has attracted particular attention to the statistics connected with the Thames, and it must be confessed that, so far, these figures exhibit a steady and continuous development. If the subjoined table, showing the record of the five leading ports for three years, be examined it will be seen that London is still a long way ahead of any other seaport in the country, and that the increase in its tonnage is greater than that of any of its rivals, with the single exception of Liverpool:

British ports.	1900. Net tons.	1901. Net tons.	1902. Net tons.
London	16,700,000	17,275,000	15,504,108
Cardiff	12,760,000	12,737,000	12,556,604
Liverpool	11,660,000	12,636,000	13,157,714
Southampton	3,009,000	3,063,000	3,224,521
Glasgow	3,682,000	3,826,000	4,144,217

"Relatively, however, to the volume of its shipping, the advance made by London is less than that not only of Liverpool, but also of Southampton and Glasgow. Cardiff is the only port of the five which displays a retrograde movement over the three years, but Cardiff, being so largely dependent upon the coal trade, is in a somewhat exceptional position. Taking other leading ports as well as those mentioned above, into consideration, there was a general improvement in tonnage last year as compared with 1901, but several still record a decrease as against the figures for 1900, more especially the English northern coal ports and Belfast and Dublin. A side issue involved in the great tariff controversy is the probable effect of differential duties on our valuable transshipment trade. So far as colonial produce is concerned it would, of course, not be affected, since there would be no duties imposed thereon, and this section constitutes a considerable proportion of the entire business, but whether a rebate on re-exports would suffice to prevent a check to the transshipment business as regards foreign goods marketed here and subjected to duty remains to be ascertained. We know, however, that, duty or no duty, the direct trade of certain great continental ports, such as Hamburg, Bremen and Antwerp, is steadily growing and that there is an increasing tendency to save, so far as possible, any intermediate handling of goods.

"The tonnage of vessels on the British register continues to advance, the total for 1902 being 11,567,000 tons, or an increase of 446,000 tons, as against 1901, which itself was about a quarter of a million tons above the previous year's figures. The colonial tonnage, however, which is included in the above total, showed scarcely any increase last year. As regards the manning of the mercantile marine, it unfortunately cannot be said that any progress was made in the elimination of the foreign element. Out of a total of 253,000 persons engaged in this employment in 1902, nearly 70,000 were foreigners. The increase in the British seamen employed was under 2,000, and even that addition brings

the total only to the figure of 1900. On the other hand, the number of foreigners so engaged increased by upward of 2,000, and of Lascars by nearly that amount, while both totals exhibit substantial increases as against 1900. In respect of construction, the year was a good one, the quantity built being 800,000 tons, which is considerably above the totals of the two previous periods. Taken all round, with the single exception of the continuous influx of foreigners into the employment, the shipping record as depicted in the present Blue Book is satisfactory enough. Whether construction has not to some extent outrun the demand for freight room is doubtful; but, apart from that, which is a point somewhat outside the scope of these statistics, it is eminently encouraging to know that the position of British shipping in the most important section of the carrying trade is being so well maintained."

SHIP BUILDING IN THE UNITED KINGDOM.

From returns compiled by Lloyd's register of shipping it appears that, excluding warships, there were 426 vessels of 1,028,099 tons gross under construction in the United Kingdom at the close of the quarter ended June 30, 1903. Particulars of the vessels are as follows, similar details being given for the corresponding period in 1902 for the purpose of comparison:

DESCRIPTION	June 30, 1903.		June 30, 1902.	
	No.	GROSS TONNAGE	No.	GROSS TONNAGE
STEAM				
Steel	397	1,020,381	379	1,107,605
Iron	2	360	1	200
Wood and Composite	2	270	1	160
Total	401	1,021,011	381	1,107,965
SAIL				
Steel	10	5,520	12	20,428
Iron				
Wood and Composite	15	1,568	13	1,180
Total	25	7,088	25	21,617
TOTAL STEAM AND SAIL	426	1,028,099	406	1,129,582

The present return shows an increase in the tonnage under construction of about 54,000 tons as compared with the figures for last quarter but a decrease of about 385,000 tons as compared with the total reached in September, 1901, which is the highest on record. Of the vessels under construction in the United Kingdom at the end of June, 352 of 789,510 tons are under the supervision of the surveyors of Lloyd's register with a view to classification by that society. In addition eighty-three vessels of 250,000 tons are building abroad with a view to classification. The total building at the present time under the supervision of Lloyd's register is, thus, 435 vessels of 1,040,419 tons. Details of this total follow:

	No.	Gross tonnage
Building in United Kingdom for home account, for sale, etc.	322	725,862
Building in United Kingdom for foreign and colonial account	30	63,648
Building abroad for United Kingdom owners ..	11	4,010
Building abroad for foreign account	72	246,899

Total building on June 30 for classification in Lloyd's register book

In addition there are now under construction in the United Kingdom fifty-seven warships of 319,700 tons displacement.

TRIALS OF BELLEVILLE-BOILERED SHIPS.

The French armored cruiser Sully, 20,500 H. P., completed at Toulon recently an official trial at slow speed. The contract called for 1,800 H. P. at a consumption of 650 to 700 grammes (500 grammes 1 lb.). The cruiser developed 2,068 H. P. on a consumption of 540 grammes per horse power per hour. On an official trial later of 24 hours' duration 10,340 H. P. was reached and the consumption per horse power per hour was 632 grammes with a combustion of 62 kilos (1 kilo is 2 lbs.) of coal per square meter of grate per hour. The contract provided for coal consumption of 750 to 800 grammes. The Sully has Belleville boilers fitted with economizers. A similar cruiser, the Marseillaise, also fitted with Belleville boilers and economizers, proved thoroughly satisfactory in a trial of 24 hours' duration at 10,000 H. P. The contract in this case also provided for a consumption of 750 to 800 grammes. At 10,658 H. P. the consumption per horse power per hour was 654 grammes. A trial of the Marseillaise at 14,000 H. P. was also required, and on this trial 14,593 H. P. was reached with fuel consumption per horse power per hour of 700 grammes and combustion of 93 kilos per square meter of grate per hour. In this instance also the contract provision was 780 to 800 grammes of coal. Of course the manufacturers of both engines and boilers are very much pleased with results of these trials.

The Reid Wrecking Co. of Sarnia and the Edward Hall estate of Detroit are said to have settled up their troubles and the steel tugs Protector and Salvor, which have been tied up at Sarnia for two years, will shortly be in service again. The Reids take the Protector and the Hall estate the Salvor. The Reids will use the Protector in wrecking business and the Salvor will be used for towing logs.

SEEN AND HEARD ON THE LOOKOUT.

Many well meaning persons are still considering Jack Tar a rather irresponsible being who is fleeced at every turn. Now without denying that an occasional sailor becomes the possessor of some variety of gold brick, the twentieth century inhabitant of the forecandle is, as a rule, rather well read and quite able to look out for his own interest. Herewith the description of an episode on the coast of Java: The flush-decked, slate-colored, English tramp steamer *Elsie* was anchored off Samarang, a small town on the north coast of Java, while from a lighter alongside the last "kranjangs" of sugar were being hoisted on board. At Batavia, the capital, is the only harbor the island boasts, and though Soerabaya, Java's second town in importance, offers fair shelter to anchored ships, Samarang remains many miles to the southward of thither consigned vessels, and is only visited by the captains. To return to the *Elsie*: From the lighter the last basket of sugar has been safely transferred to the steamer's hold. The crew has succeeded in safely transferring some sugar to the forecandle for private use, and here comes the captain who is being safely transferred from Samarang to his boat in the agent's steam launch. Ordinarily English captains take care not to load their ships below the white ring commonly referred to as Plimsoll's mark, but loading sugar off Samarang that is consigned to Ancona, a small seaport in Italy, the *Elsie's* captain had given orders to "fill her up," risking the under-the-circumstance remote chance of being fined for the sake of a good name with the owners, or perhaps a "douceur." While taking leave from the agent, who is in the act of getting over the rail to board his launch, the captain hears from the mate that the crew refuse to heave anchor. When all hands are gathered aft the overloaded condition of the ship is given as the reason of the men's refusal to commence the homeward trip, and neither the captain's threats, his promise of grog, nor his explanation that a voyage to Italy in summer time could safely be undertaken in a Chinese sampan alters the crew's determination to fight for their right on principle. After a hurried consultation in the cabin the mate goes ashore in the agent's launch to secure the services of a Lloyd's surveyor, a few policemen, the British consul and whatever other authorities the agent may deem necessary for the exigencies of the occasion. It is after supper when the captain enters the forecandle with seemingly irrelevant information that he has been master of British ships for fourteen years, that he is married to an estimable lady of Whitby, and the father of five children. It may never be known whether it was the recital of this tale of domestic felicity, or the thought of the extra work that the discharging of part of the cargo would occasion, but a note from the skipper to the effect that he owed each sailor £2 for overtime destroyed the purpose for which a Mr. Plimsoll caused a white circle to be painted on the *Elsie's* sides.

N. B.—It was early the next morning when the agent's steam launch brought the mate alongside, and though to the view of Samarang, as had from the *Elsie's* deck, distance was lending enchantment, the crew can never be convinced of that Javanese town's importance on account of their first officer's inability to even bring back one bare-footed guardian of the peace.

"Talent builds a bridge, while genius flies across the precipice," a witty Frenchman once remarked, and to some of the bridge builders among the human family it appears that that especially-in-America-so-numerous class of flying mortals known as inventors has adopted the motto of homeopathy "similia similibus curantur," or like cures like. No sooner has one genius invented a torpedo boat capable of routing a fleet of gunboats than someone else produces a vessel guaranteed to destroy a school of torpedo boats; and if we read in our morning papers that the naval authorities are experimenting with a gun that is expected to pass a projectile through any warship, in the evening papers we will notice a description of a newly-invented armor plate that refuses to open to whatever projectile's knocking. Inventors among boat builders and engineers have made swift traveling at sea possible, but while other inventions, as, for instance, the watertight compartments, have minimized the danger of ocean crossing, the speedy greyhounds are often a menace to the as-ever-still-so-numerous sailing ships. To quote a Gloucester fisherman, "if one of those flyers ever goes over my schooner she will be 10 miles from the place of execution before the shock of the collision jars the swinging glass trays in her saloon." As might have been expected a device for quickly arresting the speed of the fastest of boats has now been invented. Said invention is a water brake, or a folding fin attached to each side of the vessel and operated by levers in the wheelhouse. When not in use the fins fit close against the ship's side so that no extra friction may have to be overcome. Though engineers at once declared that the sudden rush of water against the exposed fins would wrench them from their hinges, and that in the event of their faithfully doing the duty assigned them the impact would certainly cause the people on board to be hurled from their feet, it is claimed that recent experiments with the water brake showed that a boat making 12 knots could be checked within her own length after stopping the engines, and, of course, in a shorter distance if the engines were reversed, while the predicted jar was unnoticed. The fins are fitted with hydraulic cylinders, and, as stated, operated by levers in the wheelhouse, while another advantage of a thus-equipped boat is that the opening of one fin results in the vessel immediately swerving from her course, and this a great deal quicker than could be done by the use of the rudder.

The mention of "lighthouse" almost ever suggests to most of us a foam-bordered ocean perch that is intermittently visited by

the northwester and sleet, the southwester and rain and the northeasterly wind with its company of snow and cold. From November to March this may certainly be considered the weather's routine in the vicinity of such lighthouses as Minot's Ledge off Boston harbor. The entrance to this lighthouse is half-way up the tower and a precarious looking iron ladder answers for stoop to the keeper's front door. Another spot that the mariner involuntarily associates with snow, sleet, storm and general discomfort, not to mention danger, is the Diamond shoals, off Cape Hatteras, and where a lightship, fitted with engines and boilers so that she can move under her own steam if required, has been stationed. Any seaman who has for any length of time sailed in regions where flying fishes abound, and where the weather bureau official would only have to guess between hot and hotter as a prediction for the next day, cannot have failed to long for a break in the monotony of perpetual sunshine, stifling heat and absence of wind. On a coral reef in the Red sea a lighthouse is to be seen by anyone traveling on board one of that large fleet of steamers going through the Suez canal to India. Of the four men that are hired as keepers of this light three are on duty while one of them is home for his yearly three months' vacation. During the day it is too hot to go fishing, or even to walk on the small uneven surface of the reef that shows above water, and as at night it is their duty to remain inside the tower, monotonous is a word that only incompletely expresses the existence of the four Red-sea prisoners. Two Italians, one Frenchman and one Englishman have charge of the lighthouse, and, as if to prove the truth of the late Max O'Rell's assertion that should an Englishman be cast away with a number of men of different nationalities upon an uninhabited island all of them will soon adopt the dominant Anglo-Saxon's mode of speech, the language spoken on the reef in the Red sea is English, and though at first the Frenchman attempted to acquire a little knowledge of the Italian's language, the stern command "Speak English, you 'dagos'" effectively terminated further linguistic experiments.

LARGE INCREASE IN FOREIGN COMMERCE

The foreign commerce of the United States in the fiscal year just ended is larger than in any preceding year in its history. The total of imports and exports as shown by the department of commerce through its bureau of statistics is, for the year 1903, \$2,445,610,417 against \$2,310,937,156 in the year 1900, which was considered the banner year prior to 1903. Imports are larger than in any preceding year and exports are larger than in any preceding year save in the exceptional year 1901. The imports for the first time crossed the billion dollar line, the total being \$1,025,619,127 and the exports for the second time crossed the \$1,400,000,000 line, being \$1,419,991,290 or practically \$1,420,000,000. The single year in which the value of exports exceeded those of 1903 is the fiscal year 1901 when the total was \$1,487,764,991. The imports exceeded those of 1893 by about \$159,000,000 and the exports exceeded those of 1903 by about \$572,000,000. The imports, therefore, have increased 18.4 per cent. during the decade and exports have increased 67.5 per cent. during the same period.

Comparing the figures of 1903 with those at decennial periods at earlier dates, it may be said that the imports of 1853 were \$263,000,000; those for 1863, \$243,000,000; for 1873, \$642,000,000; for 1883, \$723,000,000; for 1893, \$866,000,000, and for 1903, \$1,025,619,127. The exports of 1853 were \$203,000,000; those for 1863, \$204,000,000; for 1873, \$522,000,000; for 1883, \$823,000,000; for 1893, \$847,000,000, and those for 1903 were within a fraction of \$1,420,000,000. The imports of 1903, therefore, are less than four times those of 1852, while the exports for 1903 are practically seven times those of 1853.

The growth in importation, which is the most striking characteristic of the year's commerce, is very largely in materials for use in manufacturing. Only eleven months' figures are yet available in such detailed form as to show the increase by great growth, but the figures of the eleven months ending with May show that articles in a crude condition for use in manufacturing increased \$62,000,000 or about 20 per cent. as compared with the corresponding months of last year; articles partially manufactured for use in manufacturing increased \$4,000,000 or about 5 per cent.; articles manufactured and ready for consumption increased \$18,000,000 or about 13 per cent., and articles of voluntary use, luxuries, etc., increased \$14,000,000 or about 12 per cent., while articles of food and live animals increased \$15,000,000 or about 8 per cent.

SAMPLES OF A GOOD LUBRICATOR.

The United States Graphite Co. of Saginaw, Mich., one of the best known concerns of its kind in the United States, is so well satisfied that all the essentials of a first-class lubricator are to be found in their No. 205 lubricating graphite that they are anxious to furnish without charge to any enquirer a sample quarter-pound can for trial, together with an instructive booklet on graphite lubrication. Marine engineers are requested to give name of vessel and name of fleet to which she belongs in making application for this trial package, which in the case of vessels of the lakes will be delivered through the Detroit marine postoffice if desired. This graphite is guaranteed absolutely pure and perfectly prepared. It is also conveniently usable mixed with oil as a roof or stack paint or pipe-joint compound. It would seem advisable to make this trial test so confidently offered.

The tug *Gillen*, which was sunk just outside Superior entry some weeks ago by the steamer *Mauna Loa*, was raised last week. The boat is in worse shape than was anticipated.

CANADA AS A SHIP BUILDER.

(From the Liverpool Journal of Commerce.)

Canada is ambitiously inclined toward having, even if she has to pay for it, a ship building industry. The fine vessels which used to be turned out of the St. Lawrence yards of the sea-bound provinces were in their day ships of which any country might well be proud. Liverpool has harbored hundreds of these craft, and the "blue-noses" were ever welcome to the port, for they were splendid, well-kept ships, and their custom was eagerly sought after by the tradesmen of Liverpool, and was well worth having. Owing to the displacement of wood for the better and more durable steel in ship construction, the ring of the live-oak mallet has practically ceased in the once busy yards of the Nova Scotia mainland and Newfoundland. Fewer ships bearing the Canadian legend on their sterns are to be seen every year, and this will continue until eventually the class of ship now so decorated will be a thing of the past. But before that time arrives Canada will have her steel ships ploughing the main and supplanting those now rapidly dying out. With the development of the iron and steel industry in the Dominion, the laying of keels, the bending of frames, and the riveting of ship plates will follow as a natural consequence, for the maritime provinces will continue to breed seamen and ship builders just as has been the case in the past and is at the present time. This is a period of transition, but it does not appear that it will be very long before the sounds of the ship yard will again be stirring the air in centers suitable for ship construction. It is expected almost daily that the Dominion government will offer an increased bonus to the firm or company which will establish a competent ship building plant in the country. The amount already offered has not had the effect of inducing builders to lay down a plant, but the movement now afoot to increase the amount on offer to a sum which will enable an enterprising concern to see its way to start will have the desired effect. Nova Scotia is keen on advancing the scheme, and the decision now rests with a government which certainly has the best interests of industrial Canada at heart, and which cannot be charged with niggardliness in forwarding the Dominion's welfare. The Dominion Iron & Steel Co. is undoubtedly in the best position to take the matter up, and negotiations will be commenced with the company immediately it is decided to offer sufficient inducement. Nova Scotia would benefit immensely by the establishment of a large ship yard there, hence the evident anxiety of the local government to secure the assistance of the Ottawa government.

The Columbia Engineering Works, Inc., Brooklyn, Mass., have taken up the manufacture of the Arthur Herschmann patent steam wagons, building 3-ton and 6-ton capacity trucks, adapted for carrying coal and for general trucking purposes.

CHARACTERISTICS OF CHANNEL STEAMERS.

Engineering of London, discussing the characteristics of English channel steamers, says:

"Channel steamers differ from ocean-going steamers chiefly in the following characteristics:—1. Speed in relation to size. 2. Shortness of sea voyage, and from these follow: 3. Frequency of entering and leaving port. 4. Importance of small net register tonnage. 5. Small amount of coal carried, and consequent reduced importance of economy of fuel. 6. Most of the lines make passenger-carrying their chief consideration. Speed is one of the measurable qualities in which ships compete. The ordinary passenger cannot measure comfort, seaworthiness, or seakindness in a ship; but he can measure how long it takes and how much it costs, and if he can travel in the fastest ship for the same money as in a slower one, he thinks he has got something for nothing. This is largely why ship owners want the speed of their new ships to be greater than the old ones. Further, if it should happen that there are competing lines running to the same place, the sporting instinct is aroused in passengers if competing vessels should happen to leave or enter port at the same time; and though there never is any racing between passenger boats, it is evident that the faster boat must be the greater favorite. The runs are short, and the steamers approach more nearly to warship conditions in the relation of speed to length than any other type, though they are not burdened as warships are with the conditions of cruising at low and varying speeds for long periods, or with the necessity for a large coal endurance. Speeds are high in relation to the length, and the vessels are, therefore, among the most interesting problems in modern naval architecture. The development may be seen by tracing the changes in any one of the fleets. For instance, the London & South-Western Railway's fastest vessel in 1880 was the Dora of 1,114 tons displacement. On 10.1 ft. molded draught her speed was 16½ knots with engines which developed 2,250 I. H. P. on 109 revolutions. In 1890 three new vessels, the Frederica, Lydia and Stella, were built, for which the owners issued tenders for vessels having 17 knots speed with natural draft and 18 knots with forced draft. The vessels built obtained 19½ knots on a six hours' trial for 5,500 I. H. P. on 1,630 tons displacement, the engines running at 172 revolutions. The cost of each was about double that of the Dora. The later vessels have been of 19½ and 20 knots speed, with 4,500 and 5,300 I. H. P., and with increased accommodation and weight-carrying. All these vessels have forced draft with closed stokeholds, the ratio of weight of machinery to indicated horse power being approximately 1 to 10, all except the Frederica type having four-cylinder, triple-expansion engines."

The schooner Nellie Reddington, in tow of the Zillah, collided with the steamer Marshall F. Butters in Portage river this week.

BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (FEBRUARY, 1903)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	-	-	-	-	-	-	-	-	276,460	H. P.
English Royal Navy	-	-	-	-	-	-	-	-	849,300	"
Russian Imperial Navy	-	-	-	-	-	-	-	-	193,900	"
Japanese Imperial Navy	-	-	-	-	-	-	-	-	122,700	"
Austrian Imperial Navy	-	-	-	-	-	-	-	-	32,900	"
Italian Royal Navy	-	-	-	-	-	-	-	-	13,500	"
Chilian Navy	-	-	-	-	-	-	-	-	26,500	"
Argentine Navy	-	-	-	-	-	-	-	-	13,000	"
The "Messageries Maritimes" Company	-	-	-	-	-	-	-	-	87,600	"
Chemins de fer de l'Ouest: (The French Western Railway Co.)	-	-	-	-	-	-	-	-		
plying between Dieppe and Newhaven	-	-	-	-	-	-	-	-	18,500	"
Total Horse Power of Boilers in Use	-	-	-	-	-	-	-	-	1,634,360	

WORKS: Ateliers et Chantiers de l'Ermitage, at Saint-Denis (Seine), France.

TELEGRAPHIC ADDRESS: Belleville, Saint-Denis-Sur-Seine.

THIRD LOCK AT THE SAULT.

Maj. W. H. Bixby, government engineer at Detroit, is now at work figuring out the probable cost for the construction of a third lock at Sault Ste. Marie in order that an estimate of the expense may be submitted to congress at the next session. The major says a new lock will represent an outlay of \$6,000,000 or \$8,000,000. The matter was not recommended or mentioned in the report just forwarded to Washington by Maj. Bixby, for the reason that he recommended the work in a previous report. He was then instructed to prepare figures on the probable cost. The majority of the persons interested are of the opinion that a third lock is necessary in order that vessels may receive prompt dispatch, but there are others who think that the Weitzel lock, which is the shallowest of the two present locks, should be enlarged. However, Maj. Bixby says the expense entailed in this would amount to almost as much as for the construction of an entirely new lock; neither would it take much longer to build the new one, he says. If congress does not make the necessary appropriation and it is decided to enlarge the Weitzel lock all traffic would have to be handled through the Poe lock while alterations in the Weitzel are under way. This would be a great hardship to marine interests, as the single lock could not handle the traffic and give any kind of service. Maj. Bixby points out that if the new lock is authorized and built the Weitzel can then be enlarged, at

which time he thinks there will be enough traffic to keep the three going.

The bell which the city of Cleveland is to present to the cruiser Cleveland, now building at the yard of the Bath Iron Works, Bath, Me., has met the approval of the committee of the Cleveland Chamber of Commerce which was sent to inspect it. The diameter of the bell at the base is 2 ft. 1 in. It is 3 ft. high and the weight when cast will be 350 lbs. On it are inscribed the names of the vessels which took part in Perry's memorable battle on Lake Erie. The bell also bears two spirited figures, one representing Patriotism and the other Valor; and Perry's famous messages, which are now a part of American history.

Sunday party rates via Nickel Plate road.—Persons desiring to avail themselves of the very low rate afforded for parties of five or more traveling on same train from any station on the Nickel Plate road to any other station on that road within 100 miles from starting point and return same day, are hereby notified that they are required to procure such tickets before the arrival at starting point of the train on which they desire to travel. Agents are not permitted to sell these excursion tickets within five minutes of the time advertised for the departure of the train for which they are sold.

114, July 24.

The Blue Book of American Shipping

is a marine directory and is the only one published in the United States.

It contains a correct list of names and addresses of ship builders, engine and boiler builders, vessel owners, steamship lines, repair yards, dry docks, dredging companies, marine engineers, captains of vessels and all persons identified with shipping and its allied trades.

If you are a manufacturer or dealer in products consumed by any of these, the Blue Book is the very book you want.

It will be to your advantage to subscribe to the Blue Book in advance of its publication for this reason: A classified directory of marine manufactures and supplies is compiled from among its advertisers and subscribers and this list is consulted constantly by ship builders and ship owners. Your name will be entered under suitable headings according to your products.

It is the biggest Five Dollars worth of advertising to be had anywhere.

The 1903 edition of the Blue Book is now in course of preparation, therefore promptitude is a necessity if you desire your name to be inserted in the classified directory.

The price of the Blue Book is \$5.00 and it is delivered free of carriage.

MARINE REVIEW PUBLISHING CO.,
39-41 Wade Building,
Cleveland, Ohio.

HEATING AND VENTILATING BIG SHOPS.

Not long ago there was described in these columns the method and apparatus adopted by the B. F. Sturtevant Co. of Boston for heating and ventilating high one-story shops of great ground area, such as have been erected within the past few years by the New York Ship Building Co. at Camden, N. J., by the Fore River Ship & Engine Co. at Quincy, Mass., and by several of the leading railroads of the country. The Pennsylvania Steel Co. recently erected at Steelton, Pa., a very large shop of this kind for its bridge and construction department and in connection therewith an office building. Particulars of the heating and ventilating of these works are given in the following extracts from a letter on the subject written by an engineer of the Sturtevant company:

"Buildings of this nature offer many difficulties, not only on account of size, but also because of the great height considered as one story and the rapid rate at which heat is transmitted through single walls and skylights. At first thought, the most obvious way of heating such structures would appear to be by the distribution of steam or hot water through pipe coils or radiators placed at suitable intervals over the area to be heated. This was, in fact, one of the first methods adopted, but actual experience with it has developed a number of disadvantages, some of which are serious. In the first place, a long and extended system of piping involves many fixtures and many joints to keep tight, gives rise to danger from fire where unprotected pipes pass near wood or other inflammable material and is subject to damage by freezing in severe cold weather. Moreover, it does not deliver the heat where it is most needed, for while the neighborhood of the steam coils may be excessively hot due to direct radiation, other places at a distance are not sufficiently warmed. Most of the heat transmitted directly to the air by conduction and convection is lost, since the hot air currents rise vertically and impart their heat to the roof and skylights. Ventilation in connection with this method of heating is an uncertain and unsatisfactory affair and is usually not considered.

"The above objections are obviated in the fan and heater, or 'hot-blast' system, which has been adopted in the buildings under consideration. In this system the steam piping is concentrated in a compact heater, which is enclosed by a steel housing. Due to the greater velocity of the air over the pipes of the heater, much less length of pipe is required than if the piping were scattered throughout the shop, and all dangers from freezing and bursting of pipes, setting fire to woodwork, etc., are of course eliminated. Air taken either from the shop or from out-of-doors is forced through the heater by a fan and is then carried to various points about the shop by a system of galvanized iron piping. The exhaust from the fan engine is condensed in a section of the heater arranged for that purpose, and there is, therefore, no loss of steam due to the engine.

"The distribution of the heated air in the shop is a very important question and requires for its proper solution great care and long experience in this class of work. The hot air should be so delivered that there is no perceptible draft upon the workmen, but at the same time the outlets should be placed at short intervals apart and directed towards the floor, since that is where the heat is wanted. By this means it has been found possible, as in the works of the New York Ship Building Co. at Camden, N. J., to keep a zone of 9 or 10 ft. in height comfortably warm, while the space overhead is in comparatively free communication with the outside air. This would be impossible with direct heating, or if the hot air were delivered through a few large outlets in the upper part of the building, as is sometimes practiced.

"The ventilation of shop buildings is of considerable importance, especially during sultry weather, and the fan makes it possible to obtain most satisfactory results. On account, however, of the comparatively few number of occupants in buildings of this class as compared with the total cubic contents, sufficient ventilation will be brought about under the usual weather conditions by the leakage of air through doors and about windows and in other ways, and a considerable economy of steam can be effected by drawing the air directly from the building rather than from out-of-doors. This is always possible when heating up in the morning before the arrival of the workmen and renders that process much more expeditious.

"In the bridge and construction shops of the Pennsylvania Steel Co. there are eight fan and heater equipments, consisting each of a steam-coil heater in connection with a steam-engine-driven exhaust wheel. The heaters, with the remainder of the equipment, are built on the B. F. Sturtevant Co.'s patent, corrugated, cast-iron sectional bases, with 1-in. steam pipes set staggered and at the proper distance on centers to obtain the highest efficiency from the heating surfaces without restricting the passage of the air. The sections rest on heavy wrought-iron bases with ample provision for contraction and expansion. The fans are enclosed in three-quarter, steel-plate housings, the lower part of the fan scroll being underground and forming a part of the foundation. They are driven by direct-connected, horizontal, side-crank engines. A system of galvanized-iron pipe distributes the air throughout the buildings, the air being discharged through branch drop-connections having outlets near the floor. The ducts are of large size with bends of long radius to reduce the frictional losses to a minimum. Each drop pipe is fitted with a butterfly damper with a counterweight for holding the same open or closed as may be desired. The entire apparatus is of sufficient capacity to heat the buildings to 65° F. in zero weather. In the case of the receiving shed this applies only to a section 50 ft. in width in the middle of the building, but extending its whole length. Under the conditions of the contract the heater must take all the fresh

air from out-of-doors. However, as the number of occupants in the building are few compared with the cubic contents, it will be found perfectly feasible and more economical to return a certain portion of the air from the buildings and the apparatus is so arranged that this can be done. The apparatus is capable of changing the air in all the buildings every 25 minutes, and in the paint shops every 20 minutes.

"The office building is heated by the same method, the apparatus being designed to furnish 21,430 cu. ft. of air per minute, which is discharged into rooms having a total capacity of 289,763 cu. ft., thus providing for a complete change of air about every 15 minutes. The fan of the office-building heating plant is not driven by a steam engine, as in the case of the sets furnished for the shop, but is direct-connected to a Sturtevant motor running at 200 revolutions per minute."

TRADE NOTES.

Merritt & Co., makers of the dustproof sheet steel and expanded metal lockers, had a fine exhibit of their products at the recent convention of the mechanical engineers and master mechanics at Saratoga, N. Y. S. P. Carter of the company was in charge of the exhibit.

One of the latest vessels to be equipped at the Great Lakes Engineering Works, Detroit, with the hydro-carbon system of boiler appliances for the prevention of smoke and economy of fuel is the steamer Visitor. The steamers Rideau King and Rideau Queen have also been equipped recently with this system. The Steam Boiler Equipment Co. of 20 West Houston street, New York, controls this system, with the lake rights held by the Great Lakes Engineering Works. On the coast successful installations have been made in such well-known crafts as the John Jacob Astor yacht Nourmahal and the Howard Gould yacht Niagara, as well as several large steamers of the Oceanic Steamship Co.'s fleet.

Mr. Calvin W. Rice of the Nernst Lamp Co., Pittsburg, has announced his resignation from the company to the universal regret of his business associates, who found in him that combination of executive ability and personal attraction so much to be desired. Since May, 1902, Mr. Rice has held the position of second vice-president, to which he later added the duties of sales manager. To his efforts is due in a large measure the success of the company and its present substantial commercial standing. Mr. T. H. Bailey Whipple, who has been associated with the Sawyer-Man Electric Co. as assistant to the second vice-president, succeeds Mr. Rice in the Nernst Lamp Co. Mr. Whipple, who was formerly connected with the Jandus Electric Co. of Cleveland, is a man of wide experience and acquaintance in the electric lighting field, and eminently fitted for the position which he assumes.

In a letter to D. E. Lynn of Port Huron, general marine sales agent for the National Lead Co. of New York, Geo. L. Craig, general manager of the Craig Ship Building Co. of Toledo, gives cylinder diameters and other particulars of fifteen large triple expansion engines built at the Craig works within the past two or three years and in all of which Phoenix metal, made by the National Lead Co., is used exclusively. The list of engines includes those for the steamers Chippewa, Iroquois and City of South Haven, which are among the fastest vessels of the lakes. "This list should certainly indicate to you," says Mr. Craig, "that we are satisfied with Phoenix metal. It is, in fact, better than any metal we have ever used. The steamer Iroquois ran 44,000 miles on Lake Superior last season without one dollar's worth of repairs in the machinery department. That, we think, speaks pretty good for the metal."

A test of United States submarine torpedo boats in the Atlantic will be made at Newport in September under war conditions in conjunction with the North Atlantic fleet. The tests will follow the conclusion of the summer war games. In issuing an order to this effect Secretary Moody directed also that a competitive test of all types of submarine boats which desired to enter should take place in October for the purpose of determining which type is the best for actual naval warfare.

Capt. Chas. S. Brownell, United States engineer at New Orleans, advertises elsewhere in this issue for proposals for the construction of a steel hull stern-wheel steamboat. Particulars will be given upon application. Bids are to be opened Aug. 20.

"Seaboard Steel Castings"

A Guarantee of Quality.

Open Hearth Steel Castings of the Highest Grade for Locomotive, General Machinery and Shipbuilding Work.

Subject to U. S. Government, Lloyds, Railroad and Other Highest Requirements.

Seaboard Steel Casting Co.,
Chester, Pa.

SPECIAL TYPE OF PNEUMATIC REVOLVING CRANE.

The Garry Iron & Steel Co. of Cleveland have designed a special type of pneumatic revolving crane. This crane is made in two standard types—B and C—which are similar in design but of different capacities. Form B has a capacity of 1,000 lbs., 7 ft. reach, 12 ft. 6 in. hook lift, and height from rail to top of boom of 9 ft. 2 in. Form C cranes are of larger capacity, 2,000 to 10,000 lbs., with a standard reach of 12 ft., standard hook lift 12 ft. 6 in. and height from rail to top of boom of 15 ft. 6 in. Both sides are mounted on a heavy car and arranged for standard track gauge. The gauge may be altered to suit requirements or the cranes may be mounted on a special hand truck for convenience of moving about. Unless specially ordered the crane cars are equipped with a set of rail clamps to prevent tipping when lifting the load. On special orders cranes are built with a counter balance on the turntable. This obviates the use of rail clamps. The cars are of extra heavy design and when built as a hand truck are fitted with four wide tread wheels. The crane base is bolted directly to the car and has a machined ball race on its upper face which contains 193 ground steel balls. The bottom of the base is machined to receive the cylinder, rack, guides, pivot and stop. It has a projecting ring, the underside of which is machined for rollers and brake. The brake bracket is equipped with rollers and air cylinders actuated by a foot valve convenient to the operator and is attached to the turntable, platform and hoisting cylinder on top of the turntable. The hoisting cylinder is securely fastened to the turntable and the brake bracket, and is additionally supported on the top of the turntable by means of the vertical members of the boom proper, which are attached to the top turntable. The air for hoisting is applied to this cylinder.

The booms are made of heavy channels stiffened by top truss rods. The cables are ordinarily made in two parts for 12 ft. 6 in. hook lift, which may be modified to suit the hook lift required. The air is applied in such a way as to permit the operator to stand on top of the turntable and handle the crane for all movements without changing his position.

This company also manufactures pneumatic cranes having a horizontal boom with trolley, which racks in and out of the boom, thus giving four applications of power. The standard type of crane can be furnished with motor for traversing the car up and down the track or with hand power traversing if desired. These cranes are particularly useful in loading canal boats, freight cars, for coaling locomotives, or for purposes where heavy lifting is required.

SHIPPING BOUNTY TROUBLES IN FRANCE.

The growing discontent aroused in shipping and ship building circles in France by the unsatisfactory effects of the new mercantile marine (shipping bounties) law has culminated in a protest to the minutes of marine from shipping and ship building interests. The protest reads:

"We have the honor of calling your most serious attention to the situation created for our ship owners, and also to our ship building establishments, by the working of the law on the mercantile marine. According to article 7 of the law of April 7, 1902, the tonnage admitted to benefit by the law is fixed at 500,000 tons for steamers and 100,000 tons for sailing ships, and article 23 limits the total amount payable in the shape of outfit compensation and navigation bounties to 150,000,000 francs, of which amount 15,000,000 francs shall be the maximum payable to sailing ships. As regards the building bounties for the 500,000 tons of steam and 100,000 tons of sailing vessels, these are limited to 50,000,000 francs, the annual outlay only providing for a maximum construction of 50,000 tons of steamers and 15,000 tons of sailers. Now, according to the table compiled in execution of article 30 of the decree of Sept. 9, 1902, and published in the Journal Officiel of June 26, 1903, it results, in respect of the navigation bounty, that the figure of 150,000,000 francs provided by article 23 has already been reached, although the tonnage of vessels building only amounts to 403,679 tons, instead of 600,000 tons as provided by article 7 of the law. With respect to the building bounty provided by article 24, the orders for vessels received at the ship yards only represent an outlay of 25,416,000 francs, against a total credit of 50,000,000 francs. The situation is, therefore, satisfactory

as far as the building bounty is concerned, but it is quite the reverse in the case of the navigation bounty, the credit for which opened by article 24 is totally insufficient for the execution of the 600,000 tons provided by article 7. This contradictory state of things preoccupies the minds of all those interested. Several of our ship building establishments are partially idle, and a great number of workers are without employment. This is a serious state of things, which cannot continue without causing grave prejudice to our ship yards, our ship owners, and to the whole French marine. We have no doubt that the government has had this matter under consideration, and we would be grateful if you will inform us what measures it intends to take to remedy the evil which it was our duty to bring to your notice."

ADVANTAGES OF BALTIMORE.

Mr. George J. Gould has been making a tour of the railways which are natural feeders of the Wabash system and in a recent interview in Baltimore said that his system would be running trains into Baltimore within eighteen months.

"I regard Baltimore," said Mr. Gould, "as the most advantageous port on the Atlantic seaboard. Its harbor is a fine one and the dock charges are low. There is no reason why we should not handle an immense volume of business to that city. It should be the greatest export grain city in this country. The grain of a number of western states naturally seeks its outlet at that port. We propose to offer every facility to make its movement as free as possible. When the plans for linking up our lines to the Western Maryland are completed we will have the shortest line between Baltimore and Chicago. Because of the inland position of Baltimore this will, therefore, be the shortest line between Chicago and the seaboard. We will have a line equally short as the Baltimore & Ohio between Baltimore and Pittsburg. When the time comes for exporting pig iron, and it will come, this line should carry from the Pittsburg district to Baltimore a heavy tonnage. Besides grain there will be a very large traffic handled to Baltimore in coal and coke. The interests affiliated with our properties own extensive coal lands, and their shipping port is Baltimore. There should develop a healthy export trade in coal from that city. The advantages for sending coal from there to the other Atlantic seaboard ports are also splendid. Other phases of traffic can and will be developed and worked through Baltimore."

"In export cattle we look for a large business. There is no reason why the steamship lines running into Baltimore should not have their service increased. Ships can go there and get cargoes on the cheapest port charges. There are only certain classes of freight that will stand the port charges of New York, and this, of course, is to the advantage of Baltimore. We will have large docks, with ample water alongside of them, so that vessels can load and discharge their cargoes at a minimum of cost. The same principle will apply in the physical condition of the Western Maryland Railroad and its connections."

A syndicate has been formed in Sydney to promote a scheme of deep-sea salvage. It is intended to acquire a suitable vessel provided with a deep-sea diving machine invented by Mr. Veron of Sydney, who, it is stated, has successfully tested it for several years on pearl fishing grounds at various depths down to 96 fathoms. It is stated further that the apparatus has been so improved that it will work at a depth of 200 fathoms. The idea is to recover treasure from sunken ships by means of explosives, and operations on the steamer Eligmaite, wrecked on the New Zealand coast, will be begun shortly.

Port Colborne, the Canadian town at the junction of the Welland canal and Lake Erie, seems like a strange place for the establishment of a steel plant, and yet if the United States Steel Corporation must go to Canada with new works in order to obtain and hold trade in Canada and Great Britain, Port Colborne may present as many advantages as any other place in Canada. Ore and coal can be assembled there very cheaply by lake vessels and vessels trading down the St. Lawrence to tide-water could also load or unload at the very doors of furnaces or mills.

\$5,000 Buys Steamer Inter Ocean.

Length 214 ft., beam 36 ft. Capacity 1600 tons. Steeple-compound engine. Boiler allowed 110 lbs. steam. Address C. S. Mahoney, 17 Main St., Buffalo, N. Y. tf

Sand Sucker for Sale.

For Sale—Sand sucker of about 175 tons capacity. Equipped with 8-inch pump. In first-class condition, ready for business. Price right. Address 35 Chene St., Detroit, Mich. July 23

WHITE OAK

TIMBERS, PLANK
AND
DIMENSION STOCK

F. S. SHURICK,

18 Broadway, NEW YORK CITY

Steam Launch for Sale.

For Sale—Steam launch Cheemaun, 36x6½ ft. Petroleum for fuel. Steeple compound engine of 8 H. P. Blake auxiliary air and water pump. In excellent condition. Selling price below cost of engine. J. W. Tillinghast, Grand Island, N. Y. July 30

**PITTSBURGH WHITE METAL CO.**

MANUFACTURERS OF THE BEST

BABBITT and ANTI-FRICTION

Metals

Known for any Purpose.

Made from the Best Materials.

Price and Quality Guaranteed and Always
Consistent with the Market.

PITTSBURGH, - PA.

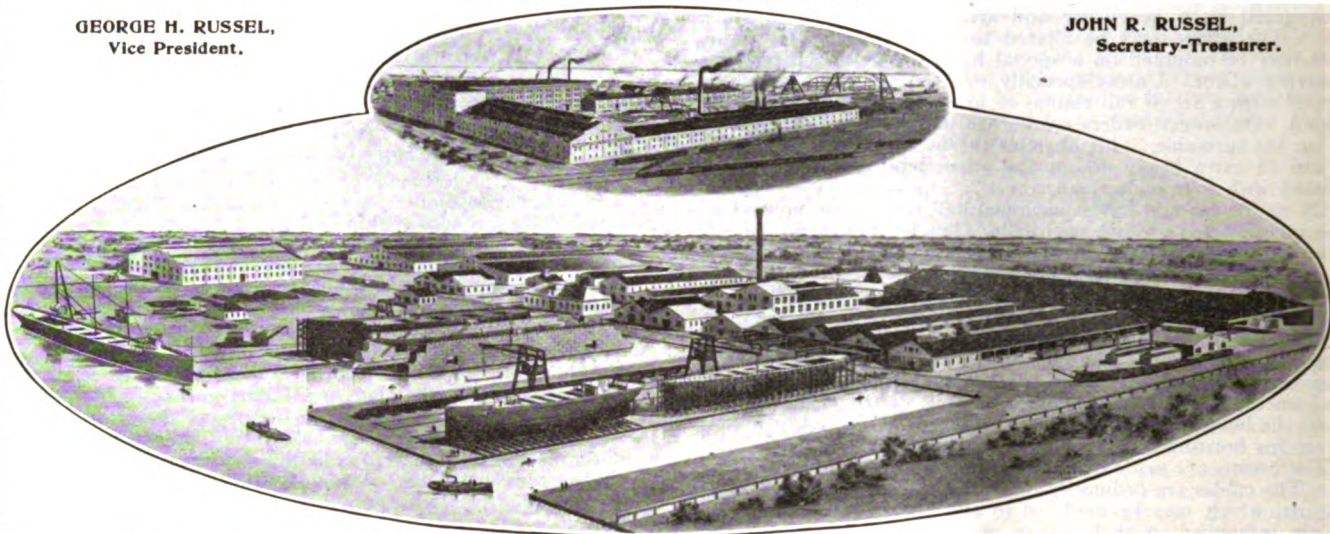
GREAT LAKES ENGINEERING WORKS

DETROIT, MICH.

ANTONIO C. PESSANO, Pres. and Gen. Mgr.

GEORGE H. RUSSEL,
Vice President.

JOHN R. RUSSEL,
Secretary-Treasurer.



Steel Ship Builders—

We have under construction a complete Ship Building Plant, modern in every detail and capable of handling the **LARGEST SHIPS** which the trade of the Great Lakes will require; also

Floating Dock—

A Floating Dock of all steel construction and equipped with the best pumping machinery and appurtenances, and with a capacity for Docking the largest Boats afloat or which may be built.

Marine Engines—

We build High Grade Engines for Lake and Ocean Service.

Propeller Wheels—

Improved designs of high efficiency, made of Semi Steel, either whole or sectional.

Hydro Carbon System—

We are the sole owners of the rights for applying this system to the Steamers of the Great Lakes. If your boilers are using too much coal, if you are short of steaming capacity, if you want to convert the objectionable black smoke into money, the **HYDRO CARBON SYSTEM** should receive your attention, as it successfully and economically handles each of the above cases.

Hydraulic Dredges—

We build all sizes for any service.

Marine Repairs—

and Supplies of all kinds, and Heavy Forgings.

Books on Naval Architecture, Ship Yard Practice, Seamanship, Etc.

AMERICAN MERCHANT MARINE—Winthrop L. Marvin. A history of American Ships and Shipping. \$2.
AMERICAN PRACTICAL NAVIGATOR—Nathaniel Bowditch. \$2.25.
DATA BOOK—Naval architects and engineers' data book. By T. H. Watson. A reliable and simple means of recording valuable data, etc., of vessels and engines. Size of book, 8½ in. by 5 in., cloth, \$1.50.
ELEMENTARY STEAMSHIP—by Barker. New and enlarged edition. \$2.50.
ELEMENTS OF NAVIGATION—Henderson. \$1.
HAND BOOK OF ADMIRALTY LAW—Robt. M. Hughes. \$2.75.
HINTS ON LEGAL DUTIES OF SHIPMASTERS—B. W. Ginsburg. \$1.75.
ILLUSTRATED NAUTICAL ENCYCLOPEDIA—Howard Patterson. \$3.
INTERNATIONAL SIGNAL CODE—Bureau of Navigation. New Edition. \$3.00.
KNOW YOUR OWN SHIP—Thos. Walton. \$2.50.
MANUAL OF ALGEBRA—R. C. Buck. For the use, more especially, of young sailors and officers in the merchant navy; numerous examples and exercises. \$1.50.
MARINE INSURANCE. W. Gow. \$1.50.
MARINER'S COMPASS IN AN IRON SHIP: How to keep it efficient and use it intelligently. J. W. Dixon. \$1.
MODEL ENGINES AND SMALL BOATS—N. M. Hopkins. New methods of engine and boiler making; ship design and construction; fifty illustrations. \$1.25.
MODERN SEAMANSHIP—Lieut. Com. Austin M. Knight, U. S. N. Adopted as the text book of the United States Naval Academy. \$2.

MODERN PRACTICE OF SHIP BUILDING IN IRON AND STEEL—Samuel J. P. Thearle. 3 volumes. Second edition, revised and enlarged. \$5.25.
NAVAL ARCHITECTURE: A treatise on laying off and building wood, iron and composite ships. Samuel J. P. Thearle. In two volumes. \$3.
NAVAL ARCHITECTURE: A manual on laying off iron and steel vessels—Thos. H. Watson. Valuable for naval architects as well as beginners in ship yards. \$5.
NAVAL ARCHITECTURE—Sir W. H. White. New Edition. 750 pages. \$9.
NAVAL ARCHITECTS AND SHIPBUILDERS' POCKET BOOK—Clement Mackrow. Formulas, rules and tables, and marine engineers' and surveyors' Handy Book of Reference. Eighth edition, revised and enlarged. \$5.
NAVIGATION SIMPLIFIED—C. E. McArthur. Containing all problems required for U. S. Local Inspector's Examination or Masters and Mates of seagoing vessels. \$1.00.
POCKET BOOK OF MARINE ENGINEERING, RULES AND TABLES—Seaton and Rounthwaite. For marine engineers, naval architects, superintendents and others engaged in construction of marine machinery. \$3.
PRACTICAL COMPASS ADJUSTMENT on Iron, Composite and Wooden Vessels. Illustrated.—Capt. W. J. Smith. \$2.
PRACTICAL INFORMATION ON THE DEVIATION OF THE COMPASS, for the use of Masters and Mates of Iron ships—J. T. Towson. \$2.
PRACTICAL SEAMANSHIP FOR USE IN THE MERCHANT SERVICE: Including all ordinary subjects; also Steam Seamanship. Wreck Lifting, Avoiding Collision, Wire Splicing, Displacement, and everything necessary to be known by seamen of the present day. Second edition, illustrated. John Todd and W. B. Whall. \$3.40.

RESISTANCE AND PROPULSION OF SHIPS—Durand. \$5.
RESISTANCE AND PROPULSION OF SHIPS—By Taylor. \$2.75.
SELF-INSTRUCTOR IN NAVIGATION AND PRACTICAL GUIDE to the examinations of the U. S. Government Inspectors for masters and mates of ocean going steamships and sailing vessels—Capt. W. J. Smith. Second edition, revised and enlarged. Cloth bound. \$2. Paper bound, \$1.50.
SELF-INSTRUCTION IN THE PRACTICE AND THEORY OF NAVIGATION—Earl of Darnley. Two volumes. \$7.
SHIP BUILDING—Tables for constructing ship's lines. Second edition. Archibald Hogg. \$2.
SIMPLE ELEMENTS OF NAVIGATION—Young. New second edition. \$2.
STABILITY OF SHIPS—Sir E. J. Reed. \$2.40.
STEEL SHIPS: Their Construction and Maintenance. A manual for ship builders, ship superintendents, students and marine engineers. Thos. Walton. \$5.50.
TEXT BOOK OF NAVAL ARCHITECTURE—J. J. Welch. \$1.50.
TEXT BOOK OF SEAMANSHIP—Com. S. B. Lee, U. S. N. Equipping and handling of vessels under sail or steam. \$10.
THEORETICAL NAVAL ARCHITECTURE: A treatise on the calculation involved in naval design. Samuel J. P. Thearle. In two volumes. \$2.50.
THEORETICAL NAVAL ARCHITECTURE—H. L. Attwood. Text book; 114 diagrams. \$2.50.
"WRINKLES" IN PRACTICAL NAVIGATION. Ninth edition, revised. S. T. S. Lecky. \$2.40.

Books on Marine Engineering, or the Operation of Engines, and for Beginners in the Engine Room.

AMERICAN MARINE ENGINEER—By Edwards. \$2.50.
ARITHMETIC OF THE STEAM ENGINE—E. S. Gould. \$1.
ELECTRIC LIGHTING—Atkinson. \$1.50.
ELECTRIC LIGHTING FOR MARINE ENGINEERS or how to light a ship by the electric light and how to keep the apparatus in order. S. F. Walker. \$2.
ENGINEER'S EPITOME—N. J. Smith. A collection of figures, facts and formulae for engineers. 50 cents.
ENGINEER'S MANUAL OF LOCAL MARINE BOARD EXAMINATIONS—By Ainsley. \$5.
ENGINES AND ENGINE RUNNING—Joshua Rose. For the use of those who desire to pass an examination to take charge of an engine or boiler; illustrated. \$2.50.
EXAMINATION QUESTIONS AND ANSWERS—Emory Edwards. 900 examination questions and answers for young engineers and firemen who desire to obtain marine licenses. \$1.50.
GAS, GASOLINE AND OIL ENGINES. Gardner D. Hiscox. \$2.50.
HAWKINS' AIDS TO ENGINEERS' EXAMINATIONS, with Questions and Answers. \$2.
HAWKINS' SELF-HELP, Mechanical Drawing. \$2.
HAWKINS' NEW CATECHISM OF ELECTRICITY. \$2.
HAWKINS' MAXIMS AND INSTRUCTIONS FOR THE BOILER ROOM. Useful to the engineer, the fireman, to the steam user or owner, and to the student of steam engineering. \$2.
HAWKINS' HAND BOOK OF CALCULATIONS FOR ENGINEERS. Comprises elements of arithmetic, mensuration, geometry, mechanical philosophy, with explanations and help rules useful to an engineer. \$2.
HAWKINS' NEW CATECHISM OF THE STEAM ENGINE. \$2.
HAWKINS' INDICATOR CATECHISM (A practical treatise). \$1.
HOW TO RUN ENGINES AND BOILERS. Practical instruction for young engineers and steam users. E. P. Watson. New fifth edition. \$1.
INDICATOR PRACTICE—Hemenway. \$2.

KEY TO ENGINEERING—Invaluable to engineers and firemen about to take examinations. Written in the plainest language and in the form of questions and answers. Postpaid, 75 cents.
KEY TO ENGINES AND ENGINE RUNNING—Joshua Rose. For use of those desiring to pass examination to take charge of an engine or boiler. \$2.50.
LESSONS AND PRACTICAL NOTES ON STEAM, THE STEAM ENGINE, PROPELLERS, ETC.—King. \$2.
LIBRARY OF STEAM ENGINEERING—John Fehrenbach, M. E. \$5.
MARINE BOILERS: A treatise on the Causes and Prevention of their Priming, with remarks on their general management. Reed. \$2.
MARINE BOILERS—Stromeyer. \$5.
MARINE BOILERS—L. E. Bertin. 250 illustrations, designs and tables. \$7.50.
MARINE ENGINES—R. Murray. \$1.50.
MARINE PROPELLERS—By Barnaby. \$4.50.
MARINE STEAM ENGINE: Its Construction, Action and Management—Carl Busley. A manual and book of reference for engineers, students, ship owners, officers of the navy and mercantile marine, and all interested in steam navigation. Thoroughly revised; third edition, \$15.00.
MARINE STEAM ENGINES—Sennet & Oram \$6.
MECHANICS' AND ENGINEERS' POCKET BOOK, including Naval Architecture, Steam and the Steam Engine, Steam Vessels, etc. 64th edition, 1060 pages. Chas. H. Haswell. \$4.
MECHANICAL ENGINEERS' POCKET BOOK—Wm. Kent. Reference book or rules, tables, etc. \$5.
MODERN EXAMINATIONS OF STEAM ENGINES—W. H. Wakeman. \$1.50.
NAUTICAL ENCYCLOPEDIA, ILLUSTRATED—Howard Patterson. Complete from Standpoint of Marine Engineer and Naval Architect. \$3.
POCKET BOOK OF MARINE ENGINEERING, RULES AND TABLES—Seaton and Rounthwaite. For marine engineers, naval architects, superintendents and others engaged in construction of marine machinery. \$3.
PRACTICAL MARINE ENGINEERING, for marine engineers and students with aids for applicants for marine engineers' licenses. Prof. W. F. Durand. \$5.00.

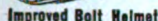
QUESTIONS AND ANSWERS FOR MARINE ENGINEERS—Thos. Lucas. Containing 307 questions, with fully explained illustrated answers. \$2.
QUESTIONS AND ANSWERS, sixth edition—Stephen Roper. \$2.
REED'S ENGINEERS' HAND BOOK—New Edition; illustrated by 545 diagrams and 56 large plates. \$5.
REED'S KEY to Reed's Hand Book—Contains working of all questions given in examination papers. \$2.
RESISTANCE AND PROPULSION OF SHIPS—W. F. Durand, principal of school of marine construction. Cornell University. \$5.
ROPER'S ENGINEERS' HANDY BOOK for Steam Engineers and Electricians. Revised and enlarged. \$2.50.
SCREW PROPELLERS AND MARINE PROPULSION—I. McKim Chase. \$2.50.
SLIDE VALVE—Julius Begtrup. Special reference to Modern Practice in the United States. \$2.
SLIDE VALVE, SIMPLY EXPLAINED—W. J. Tennant. \$1.00.
SLIDE VALVES—C. W. MacCord, Jr. A book for practical men on the principles and methods of design. \$1.50.
SMALL ENGINES AND BOILERS—Hubert F. Watson. A manual of concise and speedy directions for construction of small steam engines and boilers of modern types; illustrated. \$1.25.
STEAM AND THE MARINE STEAM ENGINE—Jno. Yeo. \$2.50.
STEAM BOILERS—Joshua Rose. Practical treatise, construction and examination. Seventy-three engravings. \$2.50.
STEAM BOILER: Its Care and Management. Stephen Roper. \$2.
STEAM ENGINE: Theory and Practice—Ripper. \$2.50.
TRIPLE AND QUADRUPLE EXPANSION ENGINES AND BOILERS AND THEIR MANAGEMENT—A. Ritchie Leask. Third edition, revised. \$2.
WATER TUBE BOILERS—Fifth revised and enlarged edition of HOW TO RUN ENGINES AND BOILERS—F. P. Watson. Practical instruction for young engineers and steam users. \$1.

Sent to any address, carriage prepaid, at prices named.

The Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland, Ohio.

[ESTABLISHED, 1878]

No. 4.



THE BROWN HOISTING MACHINERY CO., INCORPORATED

Sole makers of the "Brownhoist" High Speed Cantilever and Gantry Cranes. The most economical cranes for covering large areas in steel works or ship yards.

Machinery For Handling
Structural Work, Marine Plates, etc., in Ship Building Yards.

Coal and Ore Handling Machinery.

Cranes of all Types.
Steam, Electric and Hand Power.

Main Office and Works, CLEVELAND, O., U. S. A.

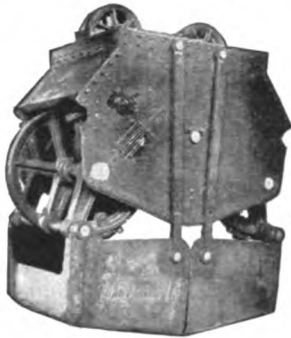
Eastern Office, 26 Cortlandt St., New York City.

Pittsburg Office, Carnegie Building, Pittsburg, Pa.

European Office, 39 Victoria St., London, S.W.

"CLAM SHELL" BUCKETS FOR IRON ORE.

HULETT PATENTS



The Wellman-Seaver-Morgan Co.
BUILDERS.

Complete Coal and Ore Handling Plants.
CLEVELAND, O.

WE CONVEY AND ELEVATE EVERYTHING.
TACKS, SAND, ROCK, ORES, RED HOT IRON, MOLTON SLAG, COAL AND SALT.

CONVEYORS AND ELEVATORS
MADE BY
THE C.O. BARTLETT & SNOW CO.
CLEVELAND, O.

We have now fitted up three fueling scows which are now in successful operation on the lakes for fueling vessels.

Send for full description.

Questions and Answers for Marine Engineers.

By THEO. LUCAS.

Sent postpaid to any address for \$2.00.

Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland, O.

GENERATORS ELWELL-PARKER ELECTRIC CO. OF AMERICA MANUFACTURERS GUARANTEES QUALITY CLEVELAND, OHIO. MOTORS

Standard Marine Generating Sets.

Complete Hoisting and Power Plants.

Established 1857.

AMERICAN SHIP WINDLASS CO.

PROVIDENCE, R. I.

SHIP MACHINERY EMBODYING THE LATEST DESIGNS AND MANY IMPORTANT PATENTED IMPROVEMENTS.

SOLE BUILDERS OF THE

Original and Only Automatic Steam Towing Machine.

SEND FOR ILLUSTRATED CATALOGUE.

P. O. BOX 53.

Address: FRANK S. MANTON, President.

MORISON SUSPENSION BOILER FURNACES

FOR LAND AND MARINE BOILERS.

UNIFORM THICKNESS—EASILY CLEANED
UNEXCELLED FOR STRENGTH.

Also Fox Corrugated Furnaces.

MANUFACTURED BY

THE CONTINENTAL IRON WORKS,

West and Calyer Sts., NEW YORK.

Near 10th and 23d Sts. Ferries.

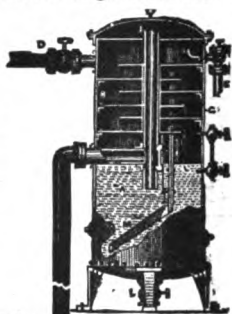
Borough of Brooklyn.



Keep Your Boilers Clean By Using CLEAN WATER.

The "BUFFALO" is Warranted to Remove all Sediment and Scale Forming Substance.

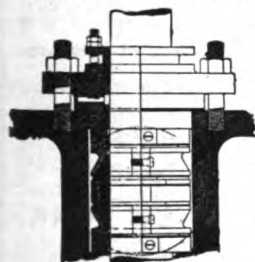
THE BUFFALO
FEED WATER
HEATER
AND PURIFIER.



The undersigned has the agency of a number of meritorious steam specialties for use on steam vessels, all of which are guaranteed to be what they are represented, and which he is prepared to furnish at a low rate. I am also prepared to superintend the making of alterations and repairs on steam vessels or power plants, at a reasonable cost, and would respectfully solicit your patronage, to which prompt and personal attention will be given.

ROBERT LEARMONTH, Patentee,
100 WHITE BUILDING, BUFFALO, N. Y.

KATZENSTEIN'S Self-Acting METAL PACKING.



For PISTON RODS, VALVE STEMS, etc., of every description for Steam Engines, Pumps, etc., etc. Adopted and in use by the principal Iron Works and Steamship Companies in this and foreign countries. FLEXIBLE TUBULAR METALLIC PACKING, for slip-joints on Steam Pipes, and for Hydraulic Pressure; also METAL GASKETS for all kinds of flanges and joints. For full particulars and reference, address:

L. KATZENSTEIN & CO.,
General Machinists, Brass Finishers, Engineers' Supplies.
358 WEST ST., NEW YORK.



H. A. J. HELVIG.

MANUFACTURER OF
SHIP LANTERNS
and LAMPS.

Carried in stock by the leading ship chandlers, who are in a position to make prompt delivery at bottom prices, also

Side Lights, Bow Lights,
Anchor Lights, Launch Lights,
Binnacle Lamps, Cabin Lamps,
Hand Lamps, Etc.

228 PEARL STREET,
NEW YORK.

British Admiralty Charts

Can be obtained from Admiralty Agent by Appointment.

145 MINORIES, LONDON, ENGLAND.

OFFICIAL CATALOGUE OF CHARTS (380 pages) 1s.

An Abridged Catalogue of Charts of Nautical Books (free on application.)

The latest Editions of Charts, Plans and Sailing Directions Published by the British Admiralty.

J. D. POTTER,

THOMAS WALKER & SON, BIRMINGHAM, ENGLAND.

THE
"NEPTUNE"
SHIP-LOG

With
Ball Bearings
for

HIGH
SPEEDS.

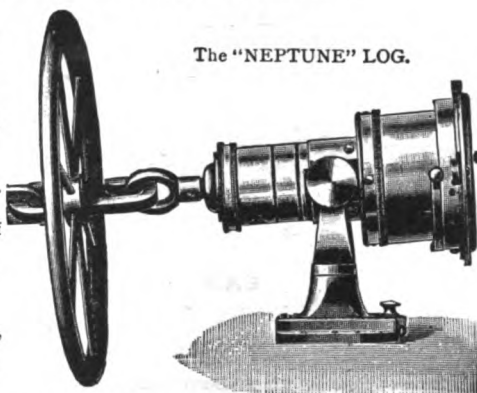
Also makers of
the

"CHERUB"

and

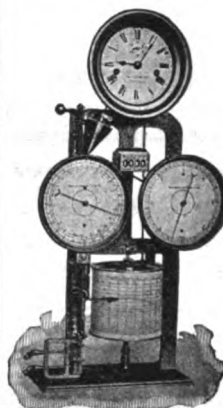
"HARPOON"
SHIP-LOGS.

The "NEPTUNE" LOG.



MAKERS TO THE BRITISH NAVY.

NICHOLSON PERFECTED SHIP LOG.



Office Detroit & Buffalo Steamboat Co.

Detroit, Mich, Dec. 12, 1902.

Nicholson Ship Log Co.—While laying up our boats for the season and reporting to our general manager, I cannot refrain from writing you direct and complimenting you on the working of your ship log. It should be adopted by all steamers. It enables the captain and engineer to know exactly the speed being made. The log is so accurate that we could not think of getting along without it.

D. McLACHLAN, Capt. Eastern States.

Manufactured by

Nicholson Ship Log Co.

204 Superior St.,

CLVELAND, O.

Steel Works and Rolling Mill Engineers

Garrett-Cromwell Engineering Co.

WILLIAM GARRETT, Manager.

New England Building, Cleveland, O.

STEEL SHIPS

THEIR CONSTRUCTION AND MAINTENANCE.

A manual for ship builders, ship superintendents, students and marine engineers. By Thos. Walton.

Price \$5.50.

THE MARINE REVIEW PUB. CO., CLEVELAND.

Pintsch Gas Lighted Buoys

Adopted by the English, German, French, Russian and United States Light House Departments for Channel and Harbor Lighting; over 1700 gas buoys and gas beacons in service.

Burn Continuously

from 80 to 365 days and nights without attention, and can be seen a distance of six miles.

Brilliant and Steady Illumination.
Economical and Reliable in Operation.

Controlled by the

SAFETY CAR HEATING and LIGHTING CO.
160 Broadway, New York City.

The United States Shipbuilding Company

43 Cedar Street, New York

Builders of all Types of Vessels

The only Company in the world that can

**BUILD, EQUIP,
ARM AND ARMOR A Modern Battleship**

without calling upon outside assistance

CAN MAKE AGREEMENTS COVERING REPAIRS OR BUILDING ON

Atlantic and Pacific Oceans

Mathias Seddinger, President.
Sommers N. Smith, Vice Pres't. and Gen'l Mgr.

ESTABLISHED 1838

The Neafie & Levy Ship & Engine Building Company.
Penn Works.

**Iron and Steel Ship and Marine Engine
BUILDERS.**

**Sole Makers of the Well Known
PHILADELPHIA PROPELLER WHEEL.**
Beach and Palmer Streets. Philadelphia, Pa., U. S. A.

W. & A. FLETCHER CO.

NORTH RIVER IRON WORKS.

MARINE ENGINES, BOILERS, Etc.

Hudson, 12th and 14th Streets, Hoboken, N. J.

Take Ferry from foot of West 14th St., N. Y.

FALLS HOLLOW ANY SIZE OUTSIDE OR INSIDE DIAMETER.
AVERAGE LENGTH OF HOLLOW BARS
EIGHT TO TEN FEET.
STAYBOLTS.
BOTH HOLLOW AND SOLID.
MADE OF BEST QUALITY DOUBLE REFINED CHARCOAL
IRON OR STEEL. CUYAHOGA FALLS, O. U. S. A.

Guaranteed to pass U. S. Government or Railway Companies' Specifications and Inspection. Samples furnished on application. Our latest prices will interest you.

CRANE VALVES
ESTABLISHED 1855



Phone Call 340 B. Greenpoint.

LANE & DeGROOT.

METALLIC LIFE BOATS.

(Formerly Raymond's)

Metallic Life Rafts, Cork Life Preservers, etc., approved by the U. S. Supervising Inspectors. Also Wood Boats of every description. Repairing of every kind promptly attended to.

305-315 Vernon Ave., Long Island City, N. Y.

THOS. DREIN & SON.

TATNALL ST. BELOW RAILROAD, WILMINGTON, DEL.



BUILDERS OF METALLIC LIFE BOATS AND RAFTS, YACHTS AND PLEASURE BOATS.

LIFE PRESERVERS.

OUTFIT FOR LAKE STEAMERS
A SPECIALTY.

Newport News Shipbuilding AND Dry Dock Co.

SHIP and ENGINE BUILDERS.

Equipped with two large basin dry docks of the following dimensions:

	No 1	No 2
Length on top	610 ft	827 ft
Width on top	130 ft	162 ft
Width on bottom	50 ft	80 ft
Draught of water over sill	25 ft	30 ft

Shops are equipped with modern machinery capable of doing the largest work required in ship construction.

Tools driven by electricity and compressed air used in constructing and repairing vessels.

For estimates and further particulars, address

C. B. ORCUTT, President.

No. 1 BROADWAY, NEW YORK.

Works at Newport News, Va. (On Hampton Roads.)

CRESCENT SHIP YARD CO.

Office and Works: **ELIZABETHPORT, N. J.**

Builders of Stern-Wheel, Paddle and Screw Steamers; also Torpedo Boats and Barges of all kinds in Steel.

A Specialty made of South American and Alaskan River Boats.

PATTERSON'S NAUTICAL ENCYCLOPEDIA. PRICE, \$3.00

Is in all respects a work up to date, correct as to every term known to the shipping world. Sent upon approval. Carriage prepaid.

THE MARINE REVIEW PUB. CO.,

CLEVELAND.

Neversink Cork Jackets and Life Belt.

Warranted 24 pounds. Buoyancy and full weight of Cork, as required by U. S. Inspectors.

Consolidated Cork Life Preservers. Ring Buoys and Fenders.

SAFEST.

CHEAPEST.

Approved and adopted by U. S. Board of Supervising Inspectors. Also adopted by the principal Ocean, Lake and River Steamer Lines as the only Reliable Life Preserver. Awarded four Medals by World's Columbian Exposition.



METALLIC
and
WOODEN
LIFE
BOATS.



Metallic Life Rafts. Marine Drags. Manufacturers of Woolsey's Patent Life Buoy—the lightest, cheapest and most compact life raft known.

DAVID KAHNWEILER'S SONS.

437 Pearl Street, New York City.

Send for Illustrated Catalogue.

A COMPLETE SET OF CHARTS OF THE GREAT LAKES

ELEVEN IN ALL.

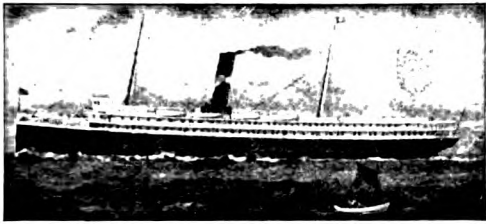
(Edges bound with Tape to Prevent Tearing.)

THE MARINE REVIEW PUB. CO., Sent to any Address, Carriage Prepaid, for \$5.45.

39-41 WADE BUILDING,

CLEVELAND, OHIO.

ROACH'S SHIP YARD.



Delaware
River Iron
Ship-Build-
ing & En-
gine Works
Chester, Pa.

Builders of Steamships and Marine Machinery.
SHIP-BUILDING IN ALL ITS BRANCHES.
NEW YORK OFFICE, MORGAN IRON WORKS Foot E. Ninth St.

Fore River Ship and Engine Co.

Successors to
Fore River Engine Co.

Steel Ship and Marine Engine Builders.

CONTRACTORS FOR

U. S. Torpedo Boat Destroyers Lawrence and Macdonough.
U. S. Protected Cruiser Des Moines.
U. S. Battleships New Jersey and Rhode Island.
U. S. Steam Light-Vessel No. 72.

OFFICE AND WORKS, QUINCY, MASS. U. S. A.

The Atlantic Works,

Builders of
Steamships,
Steam Yachts,
Tow Boats Etc

EAST BOSTON MASS.

Marine Engines, Boilers and Tanks.
Heavy Machinery and Plate Iron Work
Three Marine Railways.

MARYLAND STEEL CO.

Marine Department,
Ship Builders and Engineers
SPARROW'S POINT, MD.

Baltimore Telephone No. 11 - - - A. G. WILSON, Manager.
Long Distance Telephone Service Between New York, Philadelphia,
Boston and Sparrow's Point Offices.
New York Office: 71 Broadway. Boston Office: 70 Kilby Street.
Philadelphia Office: 312-319 Girard Building.

Risdon Iron Works

Build STEEL AND IRON SHIPS

MARINE WATER TUBE BOILERS, ENGINES

Works—Petrero. Office—Steuart & Folsom Sts.
SAN FRANCISCO, CAL.

THE LOCKWOOD MANUFACTURING CO.

EAST BOSTON, MASS.

ENGINEERS AND MACHINISTS.

Builders of STEAMSHIPS, TOW BOATS and MARINE ENGINES
REPAIRING OF HULLS AND MACHINERY.

The Allen Dense-Air Ice Machine

Contains no chemicals, only air. Proven by many years' service in the
tropics on United States men-of-war, steam yachts and passenger steamers.
A HUNDRED ARE IN DAILY SERVICE ON STEAMERS.
H. B. ROELKER, 41 Maiden Lane, NEW YORK
Consulting and Constructing Engineer. Designer and
Manufacturer of Screw Propellers.

J. E. BOTSFORD President C. O. DUNCAN Vice President F. D. JENKS Sec'y & Treas.

COLUMBIA IRON WORKS

STEEL SHIP BUILDERS

MARINE ENGINES BOILERS AUXILIARY MACHINERY

ALL KINDS OF REPAIR WORK

PLANT ST. CLAIR, MICH. OFFICE, PORT HURON, MICH.

MANITOWOC DRY DOCK COMPANY

SHIP BUILDERS

Facilities for Repairs to Steel and Wooden Vessels.

DRY DOCKS AND MAIN OFFICE: MANITOWOC, WIS.
BLANCH YARD: 34 ROBERTS STREET, CHICAGO.

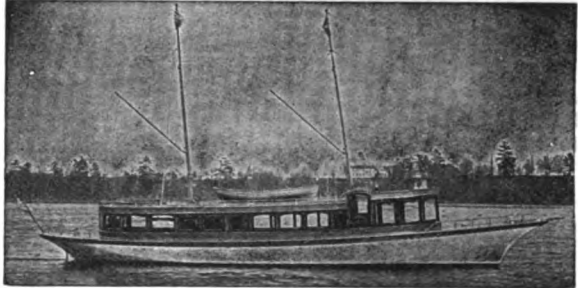
WARRINGTON IRON WORKS,

Builders of STEAM YACHTS,
TOW BOATS and
LAUNCHES.

Marine Engines, Boilers and Tanks.
Heavy Machinery and Plate Iron Works.

Foot of West Wellington St., CHICAGO, ILLINOIS.

A TRUSCOTT BOAT.



SIMPLE. SAFE. SPEEDY. RELIABLE.

It may be possible to build better and safer
boats but it hasn't been done yet. We send a
completely illustrated catalogue and price list
free, which tells you all about boats and why
Truscott Boats Excel.

TRUSCOTT BOAT MFG. CO. ST. JOSEPH,
MICH.

The Pusey & Jones Company,

WILMINGTON, DELAWARE.

BUILDERS OF Iron and Steel Steamers, Steam
Yachts, Tow Boats, Marine En-
gines, Boilers, Tanks, and of
Heavy Machinery Generally.

ALSO
COPPERSMITH
WORK.

Special Facilities for REPAIRS to both WOODEN and METAL Boats
MARINE RAILWAY. NO WHARFAGE CHARGED.

RALPH DERR, Treas. H. NEWTON, WHITTELSEY, Pres. JAMES SWAN, Consul. N. A.
HAROLD LEE, Secy. F. S. BRINTON, Constructor

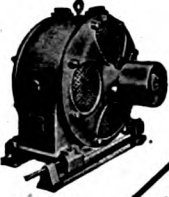
MARINE CONSTRUCTION AND DRY DOCK COMPANY of New York

Steel and Wood Vessels, Yachts, Tugs, Life Boats and Tenders.


Send Specifications and enquiry to—Works: Mariner Harbor, (S. I.) N. Y.
Telephone, 133 West Brighton. New York Office, 1023 Maritime Building.
Telephone, 3404 Broad.

Generated on 2024-08-27 10:05 GMT / https://hdl.handle.net/2027/nyu.33433109947568
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Started or stopped, from any point, at any time, by any one.



Induction Motor



Multipolar Motor

Westinghouse Motors

Westinghouse Electric & Mfg. Co., Pittsburg, Pa.

Sales Offices in all Large Cities.



MacLean Hydraulic Signal

Best Engine Room Telegraph.

Simple, Powerful, Easily Operated, Sure and Reliable. Last Signal recorded if engineer misunderstands or does not obey signal promptly.

Will not get out of order and needs no readjustment after installing. Can be easily installed. We have whistle and steering signals also for use at either end of the boat; extremely useful and convenient when backing down. For full particulars and illustrations address:

MacLean Hydraulic Signal Co.
317-318 Manhattan Building, CHICAGO.

• • Buffalo • •

Wrought Steel Ranges

Are the Best.

Steamboat and Barge Ranges with Rotary Grates.
No Cog Wheels to Warp or get out of order.

Don't take our word for it but ask some one using them.

Russell & Watson, General Steamboat Work
BUFFALO, N. Y. Send for Catalogue.

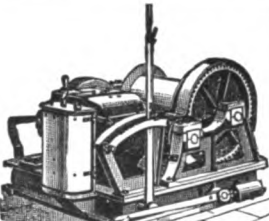
AGENTS—Topky Bros., Ashtabula Harbor, Ohio.
H. C. Weber & Co., Detroit, Mich.
John Black, So. Chicago, Ill.
Pritzlaff Bros., Milwaukee, Wis.

LIDGERWOOD
HOISTING
ENGINES

OVER 21,000 IN USE.

ELECTRIC HOISTS

Specially adapted for Docks, Warehouses and Steamships.



Lidgerwood Electric Hoist

LIDGERWOOD MILLER MARINE CABLEWAY will transfer Coal, Ammunition Supplies, etc. from ship to ship at sea.

SEND FOR CATALOGUE.

LIDGERWOOD MFG. CO. 98 LIBERTY STREET, NEW YORK.

Photographs of Ships, Docks, Etc.

We have a pretty thorough list of active vessels, of docks, elevators, coal and ore handling machinery, etc. The price at which we furnish photographs is very low. If you are interested call or write.

THE MARINE REVIEW PUBLISHING CO.,
89-41 Wade Building, Cleveland.

The Only Standard American Classification of Shipping.



Has Authorized Agents in all the principal ports of the world to protect the interests of its patrons. Vessels built under its rules, or holding certificates of class in this Record of Shipping will, with their Cargoes, insure at lowest rates. Office, 66 Beaver Street, New York.


A. A. RAVEN, President. W. R. T. JONES, Vice President.
W. H. H. MOORE, Treasurer. W. IRVING COMES, Secretary.

SHEPARD'S HORSE POWER SCALE

FOR DETERMINING
HORSE POWER,
SIZE OF CYLINDERS,
DENSITY, TEMPERATURE,
LATENT HEAT OF STEAM.

OFFERED AS A PREMIUM
WITH ONE YEAR'S
SUBSCRIPTION TO THE
MARINE REVIEW
AND MARINE RECORD
AT \$3.00.

Has sold in great numbers at \$1 each.



Geo. Stratford Oakum Co.
JERSEY CITY, N. J.
ESTABLISHED 1860
Manufacturers of all grades of

OAKUM.
Spun Cotton.

For sale at Ship Chandlers everywhere.

MARINE CHAIN

OF ALL KINDS.

Ships Cables, Dredge Chains,
Stud Link and Marine Railway Chains,
Steam Shovel Chains, Boom Chains, Etc.

CERTIFICATE OF TEST FURNISHED.

STANDARD CHAIN CO.
PITTSBURGH, PA.

The
Ideal
Pigment

TRADE MARK



REGISTERED JULY 8, 1902



The only adequate protection for Ships, Bridges and Structural Iron and Steel Work.

Mohawk Paint & Chemical Co.

SOLE MANUFACTURERS OF

Patent Iron Oxide Paints

98% Pure

NORWICH, CONN.

The only **Pure** Iron Oxide Paint.
The only Non-Crystalline Oxide of Iron.

Being porous and spongy it absorbs and retains the oil and makes a permanent, durable, unchanging, protective coating for wood and metals.

It is rust-proof and not subject to chemical action.
Unequalled for submarine use.

SEND FOR DESCRIPTIVE CIRCULAR.

Chas. E. & W. F. Peck

ESTABLISHED 1870

58 William Street, New York City.
Royal Insurance Building, Chicago, Ill.

C. T. BOWRING & CO., Ltd.

5 and 6 Billiter Ave., LONDON, E. C., ENGLAND,
AND AT "LLOYDS," LONDON.

Insurance Brokers

As brokers we represent ONLY THE ASSURED. Our clients being the VESSEL OWNERS, we refuse to represent insurance companies. We place insurances in the most advantageous market at the best procurable rates and terms. We leave it to the managers and general agents of insurance companies to protect the interests of their companies, maintaining that it is impossible for us to devote ourselves to the interest of both the owners and the insurance companies at the same time.

Average Adjusting Department
Williamson Building, Cleveland, Ohio.

GREAT LAKES REGISTER.

INCORPORATED.

Combined and Issued in Connection with the

BUREAU VERITAS

INTERNATIONAL REGISTER OF SHIPPING.

Great Lakes Register desires to announce that its ratings go before the leading Underwriters of America, England and France.

THE SERVICES OF ITS SURVEYORS MAY BE ENGAGED ON HULL AND CARGOES

F. D. HERRIMAN, SURVEYOR GENERAL,

320-322 Perry-Payne Building, - - CLEVELAND, O.

CRANE FITTINGS

"Marine White" "Marine Tints"

Mean simply Zinc White pure and tinted. Why urge an argument already closed? There is no marine white but zinc white. : : : : :

FREE—Our practical Pamphlets:

"The Paint Question,"

"Paints in Architecture,"

"Specifications for Architects,"

"French Government Decrees."

THE NEW JERSEY ZINC CO.,

11 Broadway, New York.

INSURANCE

Geo. L. McCurdy,
169 Jackson Boulevard,
Chicago, - - Illinois.

Direct Representative of Leading
American and Foreign Under-
writers.

HULLS AND CARGOES.

NEW HARBOR CHARTS OF THE LAKES.

Following is a list of harbor charts recently issued from the United States Lake Survey Office, all in colors: Duluth and Superior Harbors, Two Harbors, Ashland, Marquette, Milwaukee, Chicago, Muskegon, Toledo, Sandusky, Cleveland, Lorain, Fairport, Ashtabula, Conneaut, Erie, Dunkirk and Buffalo.

For sale by THE MARINE REVIEW PUB. CO.,

39-41 WADE BUILDING,

CLEVELAND, O.

The Donnelly Salvage and Wrecking Co., Ltd.,

JOHN DONNELLY, Sr., Pres.
JOHN DONNELLY, Jr., Vice-Pres.
H. B. FOLGER, Treas.
THOS. DONNELLY, Secy.

KINGSTON ONT.

DIVERS, STEAM PUMPS, TUGS, Etc.

SUPPLIED ON SHORTEST NOTICE.

NAVIGATION SIMPLIFIED.

Not an elaborate technical work—just an assistant for the seaman and a book of valuable plain instruction for beginners.

Contains problems required in examinations that are given by government inspectors to masters and mates of sea-going vessels.

Published by C. E. MacArthur.

CLOTH BINDING, \$1.25.

PAPER BINDING, \$1.00.

THE MARINE REVIEW PUB. CO., 39-41 WADE BLDG., CLEVELAND, O.

ESTABLISHED 1854



SHERIFFS' STEAM STEERER

For Tug Boat Use
Easy to adjust, and can be handled by any one.

MANUFACTURED BY
SHERIFFS MFG. CO.,
Milwaukee, Wis.



MacKinnon Manufacturing Co.
Boiler Makers, Founders and Machinists.
Marine Boilers, Engines and Shipyard Machinery.
Most powerful set of Hydraulic Slings on the lakes. Best towing and speed Propeller Wheels made.
SPECIALTY SMALL YACHT WHEELS.
Works & Office, 224-230 N. Water St., BAY CITY, MICH

Time and Distance Tables for Lake Ships

A set of tables showing the time required at different rates of speed, 8 to 15 miles an hour, to cover distances between all ports on the Great Lakes. A time saver to the vessel owner or vessel agent as well as captain or engineer. Send for it on approval.

Price \$1.00

MARINE REVIEW PUB. COMPANY

39-41 Wade Building,



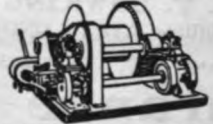
Cleveland, Ohio

H. G. TROUT, KING IRON WORKS,
BUFFALO, N. Y.



Manufacturers of
Triple Expansion, Fore-and-Aft AND Steeple-Compound Marine Engines,
High and Low Pressure Engines, Sectional Propellers, Tug and Yacht Wheels.....
Cowles' Aluminum and Manganese Bronze Propeller Wheels.
These wheels are noted for their extra speed, towing power and proportionate saving of coal.

PRICES QUOTED ON APPLICATION.

 <p>GASOLINE MARINE ENGINES Suitable for all Boats from 3½ to 200 HP. Over 100 in successful use. Also the well known and always reliable Woolters Gas or Gasoline Stationary Engines.</p>	 <p>HOISTING ENGINES Of all kinds and sizes, and for all purposes, especially for ship use. Docking and Hauling Engines and Wire Rope Windlasses.</p>	 <p>AUTOMATIC TOWING MACHINES Somewhat the cheapest, and altogether the best. Positively guaranteed. Automatic Fog Whistle Machines Steam Steering Engines.</p>
<p>FOR THESE AND OTHER WELL KNOWN SPECIALTIES ADDRESS ALL INQUIRIES TO.</p> <p>THE CHASE MACHINE CO. Engineers and Machinists, CLEVELAND, OHIO.</p>		

MARINE REVIEW

AND

MARINE RECORD.

ILLUSTRATED.

\$3 PER YEAR.

52 ISSUES.

Date

To the MARINE REVIEW PUB. Co.,

39-41 Wade Bldg., Cleveland, O.

GENTLEMEN:—Enclosed please find \$3.00, for which send THE MARINE REVIEW and MARINE RECORD for one year.

Name

The MARTIN-BARRISS Co.

IMPORTERS AND MANUFACTURERS OF

MAHOGANY, WHITE MAHOGANY

AND ALL NATIVE CABINET WOODS

High Grades of Kiln Dried Woods for Cabin Work and Inside Trim.

White Oak Timbers and Plank

Constantly on Hand and Sawed to Order on Short Notice.

654 SENECA ST. * CLEVELAND, O.

AIDS TO NAVIGATION

are of vital importance to vessel interests.

SCHERZER ROLLING LIFT BRIDGES

aid navigation and meet with the approval of all vessel interests, because of the wide and unobstructed channel provided for navigation, enabling vessels to pass easily and rapidly through the draw.

THE SCHERZER ROLLING LIFT BRIDGE CO.,

MAIN OFFICES: 1818 MONADNOCK BLOCK,
CHICAGO, U. S. A.

All of the latest and largest LAKE STEAMSHIPS are completely equipped with

BLAKE

DUPLEX AND SIMPLEX SPECIAL MARINE PUMPS.

New Marine Catalog ready about July 1st.

Geo. F. Blake Mfg. Co.

114 Liberty St., :: :: :: NEW YORK CITY.

LATEST PATENT ANCHOR

THE NATIONAL

APPROVED BY LLOYDS.

Manufactured by

L. M. BOWERS & CO.,

Binghamton, N. Y.

Catalogue on Application.

The National and International

ANCHORS.

Furnished to the Lake Trade by

The Upson-Walton Co.,

CLEVELAND, O.



BALDT ANCHOR CO.
CHESTER, PA.
U.S.A.

SHOWING
ANCHOR IN
POSITION—
STOWED IN HAWSE
PIPE



SMOOTH-ON

TRADE MARK

IRON CEMENT No. 1.

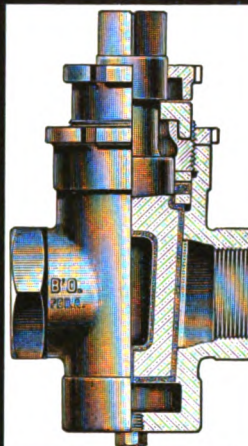
Unequalled for repairing leaks or fractures in steam or hydraulic work. This cement is a metallic composition which upon being mixed with water becomes a hard metallic iron that will withstand Steam, Water, Fire or Oil, and expands and contracts the same as iron, which makes it invaluable for boiler patching, making flanged joints, stopping leaking boiler seams, etc. Joints easily taken apart.

Write for free 60 page Illustrated Book.

Smooth-On is for sale by leading supply houses and is sold in 5, 10 and 25 pound tins.

SMOOTH-ON MFG. CO.

572-574 Communipaw Avenue,
JERSEY CITY, N. J., U. S. A.



BORDO

BLOW-OFF FOR
HIGH PRESSURE

A FEW POINTS OF MERIT.

It is made with cased plug and rustless. It opens and closes with a quarter turn. It never raises from its seat. It is always perfectly tight. It will not stick, thereby operates easily. It has full pipe area in ports. It is easily adjusted to take up wear. It is the engineer's safeguard.

L. J. BORDO

Cor. Twelfth & Thompson Sts., Philadelphia, Pa.

De Grauw, Aymar & Company.

ESTABLISHED 1827.

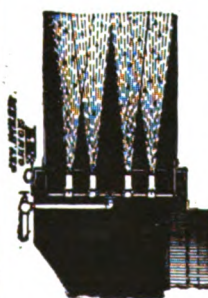
Cordage, Oakum, Vessel
and Railroad Supplies.

SOLE MANUFACTURERS IN THE UNITED STATES FOR

TYZACK'S STOCKLESS ANCHORS.

NEW YORK CITY.

The Improved Annular Steam Jet. FOR INDUCED DRAFT.



POWERFUL, ECONOMICAL.
15 to 25% increase in power.

Cut on right shows section of Jet Castings which are attached to spider in stack, as shown in cut on left.

Standard Jet gives between 3/4" and 1 1/4" draft in stack,
With Hoods gives between 1" and 1 1/2" draft in stack.

With Reducer and Dampers gives between 1 3/4" and 2 1/4" draft in stack.

REQUIRES NO ATTENTION.
ALWAYS READY FOR USE.

67 JETS IN USE.

H. BLOOMSBURG & CO.,

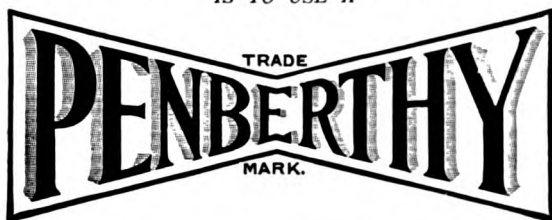
700 DOLPHIN STREET,

BALTIMORE, MD.



How Do You Fill Your Boiler?

THE MOST SIMPLE AND ECONOMICAL WAY
IS TO USE A



Automatic Injector.

When you want a Thoroughly Reliable Boiler Feeder keep the above **TRADE MARK IN MIND** and you cannot go astray.

There are numerous "**JUST AS GOODS**" and so-called "**Improvements**" on the market, but only the genuine bears the trade mark and comes up to our standard requirements as follows:

Starts Low 18 to 22 lbs. Steam.
Works High 150 to 160 lbs. Steam.
Lifts Water 20 to 22 ft. on 60 to 80 lbs. Steam.
Handles Hot Water 120 to 125 deg. on 60 to 80 lbs. Steam.

Every "**PENBERTHY**" receives a severe test on the above points before being placed in stock.

Specify "**PENBERTHY**" in ordering your steam supplies and get *Good Goods* backed by a *Good Guarantee*.

PENBERTHY INJECTOR CO.

DETROIT, - - - MICH.

Largest Injector manufacturers in the world.



U.S. AUTOMATIC INJECTOR

You Can Depend
... on the ...
U. S. AUTOMATIC INJECTOR
to do its work.

When your boiler needs water simply turn on the steam, and the Injector will feed as long as you want it to. It will not stop working as long as the suction pipe is under water. The

U.S. AUTOMATIC INJECTOR

is guaranteed to be better than any other Injector made, so do not be deceived by buying one that is claimed to be "just as good."

Our "**ENGINEERS RED BOOK**" is free for the asking. Send for a copy. Your engineer will appreciate it.

American Injector Co.

Made in the United States DETROIT, MICH. Used the World over

Cabins and Staterooms

of modern vessels, especially those in the passenger service, should demonstrate the supreme possibilities of the wood finisher's art.

This demands a special varnish, however, as atmospheric conditions are more destructive to varnish afloat than ashore and the ordinary article is of but little use.

The varnish best adapted to withstand the deleterious influences of wind, wave and weather is "**BERRY BROTHERS' SPAR VARNISH.**"

Further particulars and a unique marine puzzle sent free for the asking. Write us.

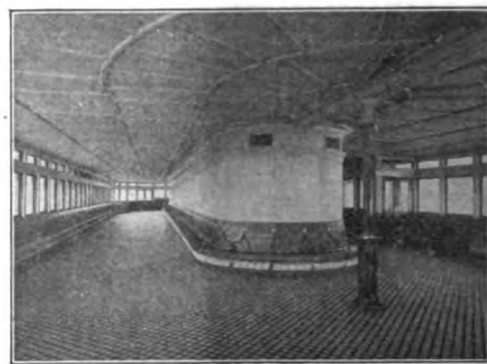
Berry Brothers, Limited,

Varnish Manufacturers,

NEW YORK BOSTON PHILADELPHIA BALTIMORE
CHICAGO CINCINNATI ST. LOUIS SAN FRANCISCO

Factory and Main Office,
DETROIT.

INTERLOCKING RUBBER TILING.



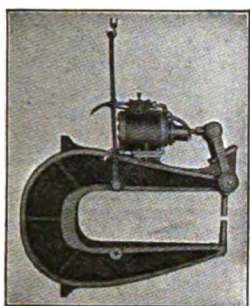
Is noiseless, non-slippery, waterproof and thoroughly sanitary, more durable than stone or earthen tiles, elegant in appearance, manufactured in a carefully selected variety of colors. Endorsed by the best architects and engineers. A perfect floor for business offices, banking-rooms, court-rooms, vestibules, halls, billiard-rooms, smoking-rooms, cafes, libraries, churches, hospitals, hotels, etc. It is especially and peculiarly adapted for Steamships, Yachts, etc. It stands the constant straining and racking without cracking or separating, and its non-slippery feature is of high value. Samples, estimates and special designs furnished upon application. Sole manufacturers.

NEW YORK BELTING & PACKING CO. Ltd.

25 PARK PLACE NEW YORK

PHILADELPHIA, 724 Chestnut St. BOSTON, 232 Summer St.
BALTIMORE, 41 South Liberty St. INDIANAPOLIS, 229 So. Meridian St.
CHICAGO, 150 Lake St. ST. LOUIS, 411 No. Third Street.
SAN FRANCISCO, 509-511 Market St.

ALLEN PORTABLE PNEUMATIC RIVETING MACHINES

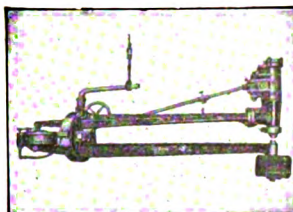


CABLE ADDRESS,
"RIVETERS" W. U. Code

United States Navy
Yard, Bremerton,
Wash.

United States Navy
Yard, Portsmouth,
N. H.

United States Navy
Yard, Mare Island,
San Francisco, Cal.



Brown Hoisting Machinery
Co., Cleveland, O.

New York Ship
Building Co.
Camden, N. J.

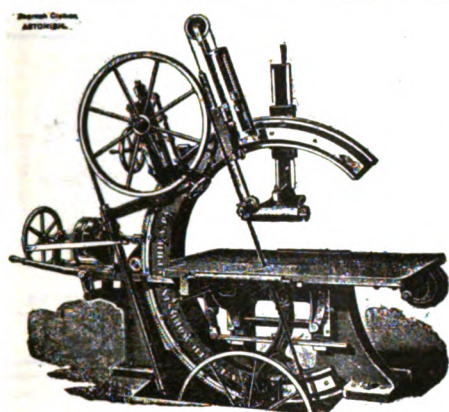
Wm. R. Trigg Co.
Richmond, Va.

Canadian Ship
Building Co.
Bridgeburg, Ont.



ESTABLISHED 1872

JOHN F. ALLEN, 370-372 Gerard Ave., NEW YORK



ADJUSTABLE BEVEL BAND SAW.
Will bevel both ways to 45 degrees.
Power Movement to change angles.
Power feed in three directions.

ESTABLISHED 1869.

INCORPORATED 1896.

ATLANTIC WORKS INCORPORATED,

Successors to Berry & Orton Company.

2223-25-27-29 Arch St., Philadelphia, Pa., U.S.A.

MANUFACTURERS OF

MACHINERY FOR WORKING WOOD

FOR USE IN

Ship Yards, Car Shops, Railroad Shops.

SEND FOR CATALOGUE.

ESTIMATES FURNISHED.

Hollow Chisel Mortisers.

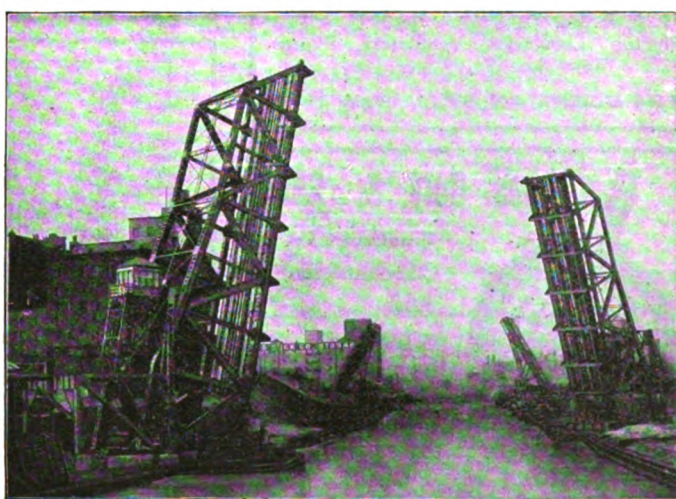
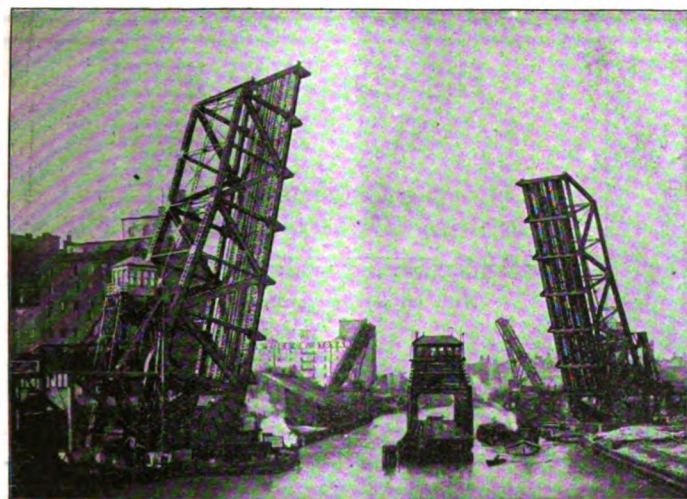
Car Sill Dressers.

The Blue Book of American Shipping

The only Marine Directory of the United States containing names and addresses of Ship Owners, Ship Masters, Ship Builders, Naval Architects, Marine Engineers and of every interest active in the Shipping Field. Also Statistics of Shipping and Ship Building in America. : : : : : : : : Sent on approval

Marine Review Publishing Company, 39-41 Wade Building, Cleveland, Ohio.

**Price
\$ 5.00**



TWO VIEWS OF

THE SCHERZER ROLLING LIFT BRIDGE

across the Chicago River at entrance to the Grand Central Station, Chicago, before and after the removal of the old center pier swing bridge, showing the obstruction to navigation caused by the center pier and protection pier of the old swing bridge, and the wide and unobstructed channel given by the new Scherzer Rolling Lift Bridge.

Preliminary Sketches and estimates of cost furnished without charge to responsible parties in any part of the world, upon request accompanied by the necessary data.

THE SCHERZER ROLLING LIFT BRIDGE CO., Main Offices: 1616 Monadnock Block, CHICAGO, U.S.A.

JOHN E. THROPP & SONS CO.,

TRENTON, N. J.



Builders of the Boyer Sectional
Water Tube Boiler.

Single, Compound and Triple Ex-
pansion Engines.

Machinery complete for light draft
Passenger Boats, Yachts, Tugs.

ALFRED B. SANDS & SON

MARINE PLUMBERS

AND MANUFACTURERS OF

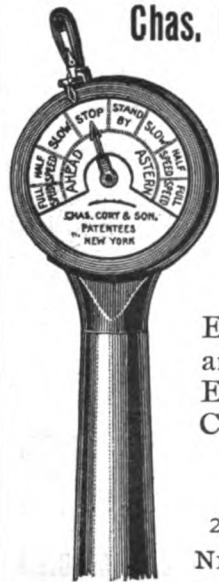
Marine Plumbing Specialties



Marine Water Closet for either above or
below water line.

Folding Lavatories, Ventilators, Pumps,
Tanks, &c., &c.

134 BEEKMAN ST., New York.



Chas. Cory & Son,

Manufacturers of
Mechanical
and
Electrical
Telegraphs
and
Indicators.

Engine Bells
and
Electric
Call Bells.

278-279 Division St.
NEW YORK CITY.

Specify LUNKENHEIMER Mechanical Oil Pumps "Perfection at last"



MODERN MACHINERY has presented new problems in
lubrication far out of reach of oil or grease in the ordinary
sense. These problems have been met and successfully met by
Dixon's Flake Graphite. Ask for booklet 77-c.

JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, N. J.

WATER FILTERS REGULATORS & ENGINES

We make Pressure Regulating Valves
for all purposes, steam or water.

Our Feed-Water Filter will keep oil
out of your boiler.

We can interest you if you use a condenser.

Water Engines for Pumping Organs



Keep Oil out of your Boiler
with the
FEED-WATER FILTER
For Marine and Land Service
Two of these Filters are
in use on the Oceanic.

THE ROSS VALVE CO. TROY N. Y.

FARNAN Brass Works

CLEVELAND, O.

23 Center St.
(near the bridge.)

OIL PUMPS,
WHISTLES,
GOVERNMENT
PLUGS, ETC.

MARINE WORK
TO ORDER.



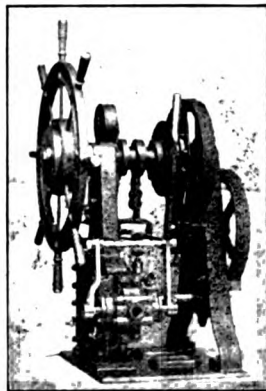
NAMES AND ADDRESSES OF

SHIP OWNERS
SHIP MASTERS
SHIP BUILDERS
NAVAL ARCHITECTS
MARINE ENGINEERS
AND OF

Every Interest Active in the Shipping Field,
Invaluable for Circular Purposes,

Are found in the
BLUE BOOK OF AMERICAN SHIPPING.
Sent on Approval, Carriage Prepaid.

MARINE REVIEW PUB. CO., CLEVELAND, O.



THE DAKE PILOT HOUSE STEAM STEERER.

A Simple Compact and Durable
Machine. Occupies Small Floor
Space.

Write for descriptive circulars and prices.

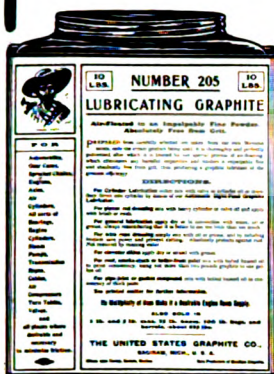
MANUFACTURED BY

The Dake Engine Co.,
GRAND HAVEN, MICH.

Specify LUNKENHEIMER "Victor" Gate Valve "An up-to-date high pressure valve"

THE NEW Graphite Lubricant

No. 205 Lubricating Graphite



REDUCES OIL AND GREASE
CONSUMPTION ONE-FOURTH

ABSOLUTELY FREE FROM GRIT
PREVENTS HOT BOXES

Mixed with linseed oil makes a preservative paint for roofs, smokestacks, boiler fronts, etc., and a superior compound for pipe joints, gaskets, stay bolts, etc.

Sample Can Free

To any Engineer who will send us his address, name of Company he is with, and (if Marine) name of his boat, we will mail free a one-quarter pound trial can and our booklet, "About Graphite Lubrication."

The United States Graphite Co.
Saginaw, Mich., U. S. A.

Mines near Torres, Sonora, Mexico.
Sole producers of Mexican Graphite.

PHOTOGRAPHS

OF VESSELS AND MARINE VIEWS.

SEE LISTS ON PAGES 37 AND 41 OF THIS ISSUE.

AMERICAN LINE NEW YORK SOUTHAMPTON LONDON

CALLING AT CHERBOURG WESTBOUND.

Sailing From New York Every Wednesday at 10 a. m.

ST. LOUIS (11,629 tons), ST. PAUL (11,629 tons),
NEW YORK (10,674 tons), PHILADELPHIA (10,433 tons)

Special Express Train from Southampton to London in one hour and forty minutes. Close connection at SOUTHAMPTON for Havre and Paris by special fast twin-screw Channel Steamers.

RED STAR LINE NEW YORK ANTWERP PARIS

Sailing Every Saturday at 10 A. M.

FINLAND (12,760 tons), KROONLAND (12,760 tons),
ZEELAND (11,905 tons), VADERLAND (11,899 tons).

One of the Shortest Routes to BELGIUM, HOLLAND, FRANCE, GERMANY, THE RHINE, SWITZERLAND and ITALY.

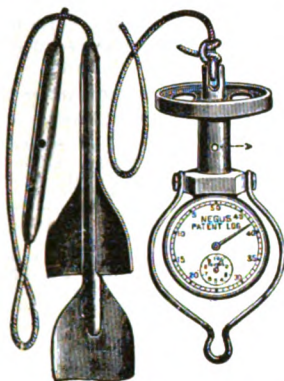
Send for "Facts for Travelers."

Office, Empire Building 73 Broadway, New York.

805-807 Walnut St., Philadelphia.
Fiske Building, 89 State Street, Boston.
1306 F St., N. W., Washington, D. C.
90-96 Dearborn St., Chicago.
Century Building St. Louis.
Guaranty Building, S. Minneapolis.
21 Post St., San Francisco.

PIERS: 14 & 15 NORTH
RIVER, FOOT OF FULTON ST., NEW YORK.

"THIS IS IT"



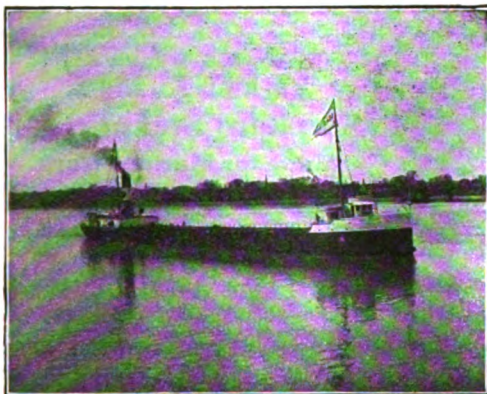
The New Negus Log
for Small Craft at a
Small Price \$10.00.
Accurate and Strong.
Get your order in. Do
you want miles or
knots? ■ ■ ■ ■

NEGUS, 140 Water Street,
NEW YORK.

A BINDER

In which to
bind your
REVIEW
each week

can be had for \$1.00 from The Marine Review
Pub. Co., 39-41 Wade Building, Cleveland, O.

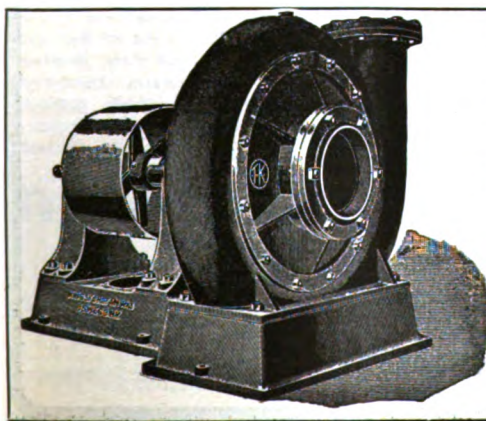


CRAIG SHIP BUILDING CO. TOLEDO, OHIO.

METAL - AND - WOODEN - SHIP - BUILDERS.

New Dry Dock—450 feet long, 110 feet wide on top,
55 feet wide on bottom, 16 feet of Water on Sill.

Repairs to Metal and Wooden Ships
A SPECIALTY.



DREDGING, WRECKING
CIRCULATING
AND BALLAST PUMPS.

**MARINE
BOILERS.**

Kingsford Foundry
& Machine Works,
OSWEGO N. Y.

MOTT'S "RICHMOND" PUMP CLOSET.



The "Richmond" is the simplest, quickest and easiest working Closet made. It has been endorsed by all who have seen it. We also manufacture a full line of Baths, Lavatories and other Sanitary goods for Marine Work.

The J. L. Mott Iron Works,
84-90 Beekman St., NEW YORK CITY.
332 Boylston St., BOSTON, MASS.
1128 Walnut St. PHILADELPHIA.

Our New Marine Catalogue is
Now Ready for Distribution.

"For that scale that you think that wont come off"

Use DEARBORN VEGETABLE BOILER COMPOUNDS made for the waters of the Great Lakes.
And then keep on using a little regularly and it wont come on again.

DEARBORN DRUG & CHEMICAL WORKS

27-34 Rialto Building, CHICAGO, ILL.

WM. H. EDGAR,
PRESIDENT.

Telephone Harrison 3930 and 3931

HARDY'S S. S. METAL.

THE MOST DURABLE AND SATISFACTORY
BABBITT METAL FOR MARINE SERVICE



FACSIMILE OF INGOT

HAS STOOD THE TEST OF 30 YEARS.

MANUF'D SOLELY BY WM. A. HARDY, FITCHBURG, MASS. U.S.A.

POSTAGE and PRINTING WASTED

Tons of it fail to reach the right people.

Not so when lists are selected from such reliable publications as the

BLUE BOOK OF AMERICAN SHIPPING.

A directory of everything pertaining to ships.

List of Ship Owners, Ship Masters, Ship Builders, Naval Architects,
Marine Engineers.

The Marine Review Pub. Co., Cleveland, Ohio.

PHOSPHOR BRONZE

REG. TRADE MARKS



THE PHOSPHOR BRONZE SMELTING CO. LIMITED,
2200 WASHINGTON AVE. PHILADELPHIA.
"ELEPHANT BRAND PHOSPHOR-BRONZE"
INGOTS, CASTINGS, WIRE RODS, SHEETS, ETC.

— DELTA METAL —
CASTINGS, STAMPINGS AND FORGINGS.
ORIGINAL AND SOLE MAKERS IN THE U.S.

DELTA METAL

RITCHIE LIQUID COMPASS



The Standard Liquid Compass.
Used Exclusively by the United
States Navy For Over
35 Years.

Over 25,000 Used in Mer-
chant Service.

Made in all sizes and
styles, from 2 to 12 inches
diameter of card. All com-
passes made by us have
our name printed below
the North point, or promi-
nently upon the card.
**NONE OTHER
ARE GENUINE.**
Latest form with four or
For sale by ship chandlers

six needles, the best instrument for iron ships.
and nautical instrument dealers.

CATALOGUE FREE.

E. S. RITCHIE & SONS,

Manufacturers of Nautical and Physical Apparatus,

BROOKLINE, MASS., U. S. A.



KIELEY

Standard Steam Trap

Made for Marine Work.

Also Reducing Valves, Steam Sepa-
rators and expansion Traps for Marine
Purpose.

SENT ON TRIAL

Good for any Pressure.

7-17 West Thirteenth St., New York

KIELEY & MUELLER

WRITE FOR CATALOGUE.

SHELBY Cold Drawn, Seamless Boiler Tubes

SUITABLE FOR ALL CLASSES OF MARINE BOILERS

Shelby Steel Tube Co., GENERAL SALES OFFICE
PITTSBURGH, PA.

BRANCH OFFICES

NEW YORK.

CHICAGO.

THE BABCOCK & WILCOX COMPANY, NEW YORK AND LONDON.

FORGED STEEL WATER TUBE MARINE BOILERS

362,000 Horsepower in the United States Navy.

186,000 Horsepower in the British Navy.

225,000 Horsepower in the American Merchant Marine.

ADOPTED BY THE BRITISH ADMIRALTY IN

LARGE CRUISERS AND BATTLESHIPS.

Orders have also been received for the navies of Italy, Russia, Norway and Denmark.

No Cast Metal.
No Bent Tubes.No Screwed Joints.
Lightness.
Accessibility.No Automatic Devices.
Safety Under High Pressure.Bayonne, New Jersey, U. S. A.
Paris, France.

WORKS:

Renfrew, Scotland.
Oberhausen, Germany.

For High-Grade Installations in the Navy and Merchant Marine

THE NICLAUSSE BOILER

609,000 Horse Power in the Navies of

ENGLAND, UNITED STATES, FRANCE, GERMANY, JAPAN, RUSSIA,
ITALY, SPAIN, TURKEY, CHILE, ARGENTINE REPUBLIC.

105,000 HORSE POWER IN THE UNITED STATES NAVY.

Manufactured by **THE STIRLING COMPANY, CHICAGO, ILL.**

Screw Propeller Computer

(McDERMOTT)

For quickly determining dimensions and proportions
of screw propellers for any set of conditions.**\$5.00**

The Roberts Boiler Co.

Has Built Nearly 1,500
Boilers to Date.For Launches, Yachts, Passenger and Freight Steamers,
Dredges, Tugs, Stern-wheelers, Canals;
Also for Navy Department, War Department, Treasury Department,
Light-House Board and Revenue Cutter Service;
Also for N. Y. Dock Department and U. S. Supervisor, Harbor of N. Y.

SAFETY AND ECONOMY.

Never killed a man or had a serious accident. \$250,000 capital.
Works covering 29,000 square feet of ground. Never had a boiler
returned on account of dissatisfaction. Every boiler warranted. All
material made specially for our use. All boilers tested at 500 pounds
hydrostatic pressure and 250 lbs. of steam before shipping. Work-
manship strictly first-class. All joints screwed and reliable. No
expanded joints. State your requirements and we will furnish speci-
fications. Correspondence solicited.

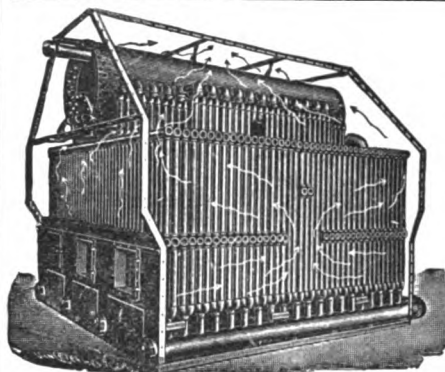
The Roberts Safety Water-Tube Boiler Co.

Works, Red Bank, N. J.

39 and 41 Cortlandt St., NEW YORK CITY.

TELEPHONE: { NEW YORK OFFICE, 699 CORTLANDT.
OFFICE OF WORKS, 49 RED BANK, N. J. Cable Address,
"BRUNIVA, N. Y.

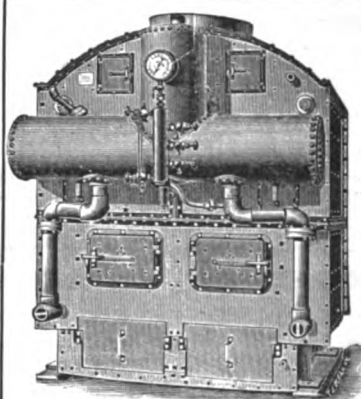
Economy is not the Only Good Feature



... OF ...

TAYLOR WATER TUBE BOILERS

They are

Safe, Reliable, very durable and always furnish
dry steam. Write for full description.TAYLOR WATER TUBE BOILER CO.,
322 Franklin St., DETROIT, MICH.

250 STEAM
VESSELS
NOW EQUIPPED WITH
ALMY'S PATENT
SECTIONAL
Water-Tube Boilers
BEAR EVIDENCE OF THEIR
Excellent Qualities
ALMY WATER-TUBE
BOILER CO.
PROVIDENCE, R. I.

The LITTLE RED BOOK for 1903 WILL TELL YOU

The name of the Captain, Engineer and Owner of about 2000 vessels of the Great Lakes.

A new list in the book this year shows the capacity in iron ore of every vessel that is suited to carrying iron ore. This ore capacity list is made up from averaging all cargoes for 1902.

It can be carried in the vest pocket or placed in the pigeon hole of a desk.

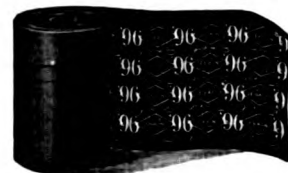
SENT ON
APPROVAL

Price \$1.00

MARINE REVIEW PUB. CO.,
39-41 Wade Building,
CLEVELAND, O.

JENKINS '96 SHEET PACKING

The
Perfection
of Joint
Packing.



Cheapest
and Best
in the
Market.

Makes joints instantly that will be perfectly tight for years on any and all pressures of steam, ammonia, oils, acids, etc. Does not deteriorate with age. **Weights less**, therefore cheaper than any other packings sold at equal price per pound. Send for sample and give it a test.

JENKINS BROS., New York, Philadelphia, Chicago, Boston.

The Shipowners Dry Dock Co.,

CHICAGO.

Repairs to
Steel and Wooden Vessels.

Three Docks at Halsted
Street and North Branch.

OFFICES, RIALTO BUILDING.

OFFICE TELEPHONE, HARRISON 1020.
YARD TELEPHONE, NORTH 1659.

W. W. WATTERSON, Supt.
TELEPHONE, LAKEVIEW 198.



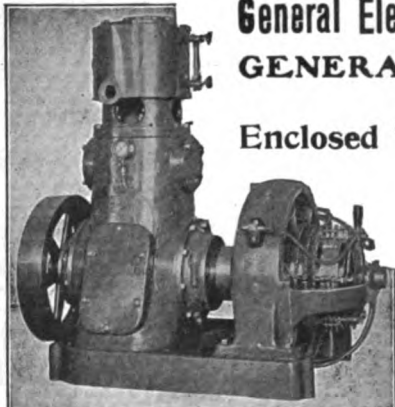
ASHTON

Cam Lever Pop Safety Valves
and Non-Corrosive steam gauges

give highest efficiency and durability.
Specify them and get the best.

The Ashton Valve Co., Boston, New York
and Chicago, U. S. A.





**General Electric Company's
GENERATING SETS
WITH
Enclosed Type Engines.**

Have automatic forced lubricating, which reduces wear and attention to a minimum and insures quiet operation.

Sizes from 7 KW. to 25 KW.
Write for Bulletin 4272.

General Office,
Schenectady,
New York.

A MARINE GENERATING SET.
Cleveland Office, 310 New England Building.
SALES OFFICES IN ALL LARGE CITIES.

Hand Book of ADMIRALTY LAW
By Robt. M. Hughes.
\$3.75.

Marine Review Pub. Co., - - Cleveland, O.

**THE
BOURNE-FULLER CO.**

**IRON, STEEL
and
PIG IRON.**

Cleveland, O.

Exclusive Sales Agents for
Northern and Southern Pig Iron.
Also Foundry Coke.



**WRITE
FOR
CATALOG**

"BOYER" RIVETING HAMMER.

**THE WORLD RENOWNED
"LITTLE GIANT" and "BOYER"
PNEUMATIC TOOLS.**

Universally Acknowledged to be the BEST.

CHICAGO PNEUMATIC TOOL CO.

General Offices: Fisher Bldg., CHICAGO. Eastern Office: 95 Liberty St., NEW YORK.

The Cleveland Trust Company

A safe depository for
the surplus funds of
firms, corporations and
individuals.

4% on Savings Deposits.

CAPITAL and SURPLUS - \$2,800,000.00
DEPOSITS - - - \$15,000,000.00

NO 1 EUCLID AVE NO 121 EUCLID AVE

THE L.P. & J.A. SMITH CO.

CONTRACTORS FOR PUBLIC WORKS

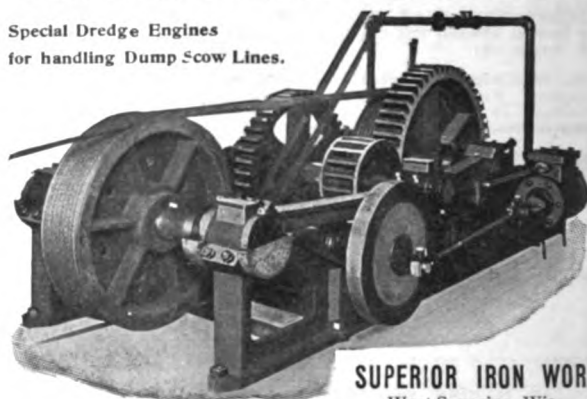
Dredging,
Harbor Work,
Pile Driving,
Breakwaters,
Dry Docks and
Pier Building.

Railroads,
Canals,
Bridges,
Submarine
Foundations,
Etc., Etc.

Offices: Williamson Bldg., Cleveland, O.

CAR HAULAGE ENGINES

Special Dredge Engines
for handling Dump Scow Lines.



SUPERIOR IRON WORKS
West Superior, Wis.

4 PER CENT ON SAVINGS.



CAPITAL \$1,500,000.

(Surplus and Undivided Profits Earned \$152,000.)

Pays Interest on Check Accounts.

Acts in Any Trust Capacity.

Superior, Corner Water Street.

FAHEY & CO. Bankers & Brokers.

TELEPHONE, MAIN 2754.

1011-1015 THE WILLIAMSON BLDG.

CLEVELAND, O.

EVERY POSSIBLE FACILITY FOR CONDUCTING A BROKERAGE
BUSINESS IN STOCKS, BONDS, GRAIN, ETC.

C. H. McCutcheon,

Copper, Tin and Sheet Iron Marine
Work. Engineers' Supplies.

Brass Cocks, Globe Valves and Couplings, Iron Pipe
Fittings and Supplies, Rubber Hose, Packing, Springs, Usudurian Packing. Buffalo, N. Y.

WEEKLY.

ILLUSTRATED.

PRICE 6D.

"THE SHIPPING WORLD"

Written by Experts

Illustrated by Artists

ANNUAL SUBSCRIPTION, UNITED KINGDOM \$5.11
OTHER COUNTRIES - - - \$6.82

Contains the best and most informing
illustrated literature regarding

Naval Architecture

Marine Engineering

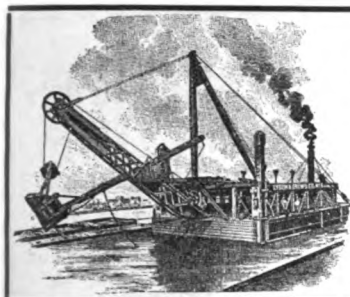
Commercial & Shipping

Questions of the Day

The Shipping World Ltd.

Effingham House, Arundel Street, Strand,
LONDON, ENGLAND.

Subscriptions and advertisements for The Shipping World
accepted at The Marine Review offices.



Chicago & Great Lakes Dredge and Dock Co.

SUCCESSORS TO
LYDON & DREWS CO. of Chicago,
HAUSLER & LUTZ TOWING & DOCK CO. of So. Chicago.

Contractors for River and Harbor Improvements.
Designers and builders of Foundations, Bridges, Piers, Break-
waters, Lighthouses, Tunnels, Pneumatic & Sub-Marine work.

1319-20-21-22 Chamber of Commerce Bldg.
Telephones: Main 794
So. Chicago 63
CHICAGO.
Yards, North Branch, Foot of Carpenter St.,
and Calumet Slip, South Chicago.

Photographs of Lake Vessels. ★ ★ ★ ★ ★

Unless otherwise specified, negative size of following Photographs is 7x9 inches, and price is 75 cents each. Postage paid. ★ ★ ★ ★ ★

Alva.
Angeline, Hold. (Size 10x13—Price \$1.25).
Angeline, Spar Dock. (Size 10x13—Price \$1.25).
Argyle. (Thousand Islands).
Argyle. (Thousand Islands).
James Battle. (Detroit Fire Boat). On the ways.
James Battle. (Detroit Fire Boat). The launch.
Castalin.
Chicora.
Chippawa.
City of Bangor.
City of Erie at Buffalo Docks.
City of Erie.
Columbia. (On the Ways—Three Views).
Columbia.
Conemaugh.
Coralla, loading at Escanaba Ore Dock. (Size 17x21—Price \$2.00).
Corleca.
Corona.
John Craig.
M. M. Drake.
Eastern States. (Launch).
Eastern States on First Trip. (Three Views).
Eastern States. (On the Ways—Three Views).
Isaac L. Ellwood.
Excelsior. (Detroit Ferry).
H. C. Frick.
Garland. (Detroit Ferry).
Greyhound.
Harlem.
Harvard. (On the Ways).
Harvard. (The Launch).
Harvard. (In the Slip—Two Views).
Helena.
Hennepin.
Islander. (Thousand Islands—Two Views).
Frank E. Kirby at Put-In-Bay.
Lackawanna.
Mahoning.
Hahoning.
Michigan Central in Detroit River. (Winter).
Mohawk.
Montana.
W. B. Morley, wreck in Detroit River, Aug. 6, 1899.
Simon J. Murphy. (On the Ways).
Simon J. Murphy. (On the Ways—Two Views).
Simon J. Murphy, Launch. (Bow in Slip, Stern not yet in Water).
Neshoto.
New Island Wanderer. (Thousand Islands).
New York. (Thousand Islands—Two Views).
North King. (Thousand Islands).
North Land, in the "Soo" Locks. (Two Views).
North Land, at Mackinac Island. (Two Views).
North Land and North West in Winter Quarters.
Onglira. (Two Views).
Peerless, at Mackinac Island.
Pere Marquette No. 17.
Plankinton at Northwestern Coal Docks, Duluth.
Pleasure, at Dock (Detroit Ferry).
E. C. Pope.
Princeton.
Ramapo.
W. D. Rees.
Rube Richards, in Ship Canal at Duluth.
St. Lawrence (Thousand Islands).
Ste. Marie, in Mackinac Straits.
Howard L. Shaw. (On the Ways—Three Views).
Howard L. Shaw. (The Launch).
Howard L. Shaw. (In the Slip).
Sir William Siemens.
George Stone.
Tashmoo. (In Dewey Naval Parade, Detroit River).
Tashmoo, June 9, 1900.
Tashmoo. (Entering St. Clair Flats Ship Canal).
Tashmoo. (Landing at Star Island—Two Views).
Toronto. (Thousand Islands).
Toronto. (Thousand Islands—at Alexandria Bay).
Toronto. (Thousand Islands—at Gananoque).
Transport, in Detroit River, Winter. (Car Ferry—Two Views).
Troy.
Uganda, in Ship Canal at Duluth.
United Empire.
Capt. Visger. (Thousand Islands).
E. P. Wilbur.
Western States. (Size 10x13—Price \$1.25).
Yosemite.

ORDER FROM

Address: MARINE REVIEW PUB. CO.,
39-41 Wade Bldg., Cleveland, Ohio.

BUFFALO DREDGING CO.

GENERAL CONTRACTORS ON SUBMARINE WORK.

Office D. S. MORGAN BLDG.

BUFFALO, N. Y.

THE LAKE ERIE Dredging Co.,

BUFFALO, N. Y.

Dredging; Submarine Rock Removal, Etc.

U. S. Engineer Office, 3232 Prytania St., New Orleans, La., July 21, 1903. Sealed proposals will be received here until 11 a. m., August 20, 1903, for constructing steel hull sternwheel steamboat, delivered at New Orleans, La. Information on application, CHAS. S. BROMWELL, Capt. Engrs. Aug. 13

U. S. Engineer Office, Milwaukee, Wis., July 14, 1903. Sealed proposals for moving cribs at southerly end of breakwater, Racine Harbor, Wis., will be received here until 3 p. m., Aug. 4, 1903, and then publicly opened. Information furnished on application. J. G. WARREN, Major, Engrs. July 30

Small Steam Barge for Sale.

I have for sale a small steam barge. Carries 250 tons. Address, Capt. F. E. Wood, Alexandria Bay, N. Y. t f

Boiler and Engine for Sale.

Both in first-class condition. Boiler 10½ ft. in diameter and 14 ft. long; 120 lbs. steam allowed. Fore and aft compound engine; high-pressure, 22 in. diameter low-pressure, 44-in., with 36 in. stroke. Address Barry Trans. Co., East End Michigan St., Chicago, Ill. t f

Side-Wheel Passenger Steamer.

For Sale—Passenger and freight steamer Urania. British registry. Built at Milwaukee in 1875 and then named Flora. Rebuilt in 1899 with engines from revenue cutter Andrew Johnson. Wooden hull. Three decks. Length 180 ft.; breadth 27 ft. 4 in. Thirty-three staterooms, 98 berths. Allowed 98 first-cabin and 402 steerage passengers. Speed 13 miles. Electric light plant practically new. Engines and boilers were thoroughly overhauled when transferred to this hull and have been well kept up. Urania has been running between Cleveland and Port Stanley and fuel consumption for day and night trips on run was about 400 tons per month. Address Box 41, the Marine Review Pub. Co., Wade Bldg., Cleveland. t f

Tug for Sale.

Tug Warwick—Engine 15x17. Boiler allowed 110 lbs. steam. Both in first-condition. Hull practically new. Boat inspected and ready to run. Cheap for cash. Can be seen at Toledo, O. Apply to James Rooney, 1118 Collingwood ave., Toledo, O. t f

Passenger Steamer and Tug for Sale.

Steamer Ogantz, 80 ft. keel, 18 ft. 8 in. beam, 7 ft. 6 in. draught. Fore and aft compound engine, 14 and 25 by 16 in. Scotch boiler, 10 ft. by 84 in., allowed 125 lbs. steam. Passenger allowance—45 regular and 190 excursion.

Tug Dan Connelley, 65 ft. keel, 16 ft. 6 in. beam, 8 ft. 6 in. draught. Iron boiler 13½ ft. by 76 in., allowed 90 lbs. steam. Double engine, 14x15 in.

These boats were in commission last season and are in good condition. Price reasonable. For particulars address The Sandusky Fish Co., Sandusky, O. t f

COMPASS ADJUSTER

CAPT. J. M. FIELDS

Inventor of and Agent for

Fields' Patent Course Finder

Bethel Hotel - Cleveland, Ohio

ORAM FIX. ESTABLISHED 1880. J. W. FIX.

S. FIX'S SONS,

Successors to S. Fix & Son,

Steam Flue Welding Works

Our Work Stands Government Test.
Our Welds are Perfectly Smooth.
Write us for Prices.

COR. LEONARD AND WINTER STS. Cleveland, O.

John D. Gilchrist, Pres. John Marron, Sec'y.
John A. Flajole, Gen'l Mgr.

THE FOREST CITY BOILER CO.

Marine Work a Specialty.

264 Merwin St. Tel. Main 1886
CLEVELAND, OHIO.

A full stock of the new colored army charts, as well as all the latest hydrographic office charts and sailing directions, is kept on hand at all times by the


MARINE REVIEW PUB. CO.,
39-41 WADE BUILDING, CLEVELAND.

Nothing but the latest charts, corrected up to date are sold.

DOWNING METALLIC PACKING
Sold Under 5 Years' Guarantee

WRITE FOR CATALOGUE

THE N. L. HAYDEN MFG. CO.
COLUMBUS, OHIO



Standard Automatic Releasing Device.
The Falls are so rove that both ends of the boat detach, irrespective of which end strikes the water first.

Will release a boat immediately in the roughest sea or under speed and can be hooked on without delay or injury to the hands of men hooking it on. * * * * *

Standard Automatic Releasing Hook Co..
New Cheesebrough Bldg.
17 State St., New York.



Fogg's Resilient Felt Mattresses and Cushions.

Manufactured By.
M. W. FOGG,
202 Front St. N. Y.

Send for Illustrated Catalogue.



PICKANDS, MATHER & CO.,

FUEL LIGHTERS at Buffalo, Erie, Ashtabula, and Cleveland. At Detour, Mich., a Fuel Dock equipped with shute capacity of 600 tons. Best quality Pittsburgh coal furnished at any time during Day or Night.



Western Reserve Building, CLEVELAND, O.

Time and Distance Tables

Most Valuable Little Book ever issued by The Marine Review

Send for it on Approval.

A set of tables showing the time required at different rates of speed, 8 to 15 miles an hour, to cover distances between all ports on the Great Lakes. A time-saver to the vessel owner or vessel agent as well as captain or engineer.

Everything at a Glance

Examination of it for the Asking.

Price \$1.00

THE MARINE REVIEW PUB. CO.
Wade Building, Cleveland.

A few of the best works on

Naval Architecture, Ship Yard Practice, Seamanship, Etc.

Modern Seamanship, by Lieut. Com. Austin M. Knight—\$6.
Thearle's Works { Modern Practice of Ship Building in Iron and Steel—\$5 25.
Naval Architecture: A treatise on laying off and building wood, iron and composite ships—\$3.
Theoretical Naval Architecture—\$3 50.
Naval Architecture—A manual on laying off iron and steel vessels, by Thos. H. Watson—\$5.
Naval Architecture, by Sir W. H. White—\$9.
Mackrow's Pocket Book—\$5.
Steel Ships, by Thos. Walton—\$5.50.
Resistance and Propulsion of Ships, by Durand—\$5.
Practical Seamanship, by Todd and Whall—\$8.40.

ORDER FROM
The Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland.

J. B. COWLE, Pres. W. E. PERKINS, Sec'y and Treas
MAT. THOMAS, Gen'l Mgr.

The Union Machine & Boiler Company,

MACHINISTS, FOUNDERS AND BOILER MAKERS.
Jobbing solicited. Steel vessel repairs promptly attended to night or day.
108 TO 114 RIVER STREET. CLEVELAND, O.
Phones: Bell Main 609. Cuy. A. 711. Night Call Cuy. M. 1843.

ABRAM SMITH & SON,
ALGONAC, MICH.

Wooden Ship Building and Rebuilding.

Before placing your work we will be pleased with an opportunity to quote YOU our prices.

Steamboat Fuel at Ashtabula. Large Supplies of best Quality.

Fuel scow with elevators and discharging spouts. Storage of 650 tons. Discharges 150 tons an hour into steamers while unloading cargo.



M. A. HANNA & CO. Miners and Shippers,
Main Office Perry-Payne Bdg. Clev'd.

LIGHTER Carrying Different Grades at all Times.

The Graham Coal & Coke Company, Ltd.

1008-9 Chamber of Commerce
WHOLESALE

COAL COKE



Exceptional facilities for Supplying Vessels.
Steamboat fueling pockets at foot of 21st Street.
Detroit, Mich. Dock Phone Mich. W 266

CASTNER, CURRAN & BULLITT,

SOLE AGENTS FOR

C. C. B. POCAHONTAS SMOKELESS SEMI-BITUMINOUS COAL

THE BEST STEAM COAL IN THE WORLD.



Officially endorsed by Great Britain and United States. Standard Fuel of United States Navy. For ten years used exclusively on Cunard, White Star and other Transatlantic Lines.

Main Office, Arcade Bldg., 1 S. 15th St., PHILADELPHIA, PA.

BRANCH OFFICES:

1 Broadway, New York.
Citizens' Bank Building, Norfolk, Va.

Old Colony Building, Chicago, Ill.
70 Kilby Street, Boston, Mass.
4 Fenchurch Avenue, London, England.

Terry Building, Roanoke, Virginia.
Neave Building, Cincinnati, Ohio.

PITTSBURG COAL COMPANY.

Steamboat Fueling Facilities at Various Points on the Great Lakes:

CLEVELAND HARBOR { 4 Car Dumpers.
3 Lighters.

FAIRPORT HARBOR { 1 Car Dumper.
1 Lighter.

ASHTABULA HARBOR { 1 Car Dumper.
1 Lighter.

ERIE HARBOR { 1 Car Dumper.
Fuel Pockets.

DETROIT RIVER BRANCH { Docks and Pockets at
Sandwich and Amherstburg.

SAULT RIVER BRANCHES { Dock and Pockets at Detour.
Dock and Pockets at Sault Ste. Marie. (The Port Royal Dock Co.)

WE FURNISH ONLY
THE BEST GRADE OF

Pittsburg and Youghiogeny Coal.

GENERAL OFFICE, LAKE DEPARTMENT, PERRY-PAYNE BUILDING, CLEVELAND, OHIO.

STEAMBOAT FUEL AT CHICAGO. . . .



Youghiogeny and
Lehigh Coal Company.

J. T. CONNERY, ARCHIE J. HITCHCOCK,
Manager
Main Office: 902-906 Fisher Bldg.,
277 DEARBORN STREET.

FUEL DOCKS.

No. 1, Michigan Slip and Basin, - - - 'Phone Har. 4156.
No. 2, North Halsted Street Bridge, - - - 'Phone Har. 4157.
No. 3, Foot South Water St. and Illinois Central Slip C.
'Phone Har. 4158.

FUEL LIGHTER.

Equipped with 125 2-ton Buckets for Fueling Anywhere in Harbor.
Long Distance Telephone, Har. 4156.

The Rochester & Pittsburgh Coal

& Iron Co.—Steamboat Fuel Dock—
Blackwell Canal at
Michigan St. Bridge. 1400 feet of dock
frontage. Hulett Car Dumping
Machine. Steam Fuel Scow of 550 tons
capacity. Boats coaled day or night.
Office: 684-88 Ellicott Sq. Buffalo, N. Y.
Telephone, Seneca 1154.
E. McQ. Duthie, Cargo and Fuel Agent.

REYNOLDSVILLE
COAL

THE STANLEY B. SMITH COAL AND DOCK CO.

Toledo Harbor,

Toledo, Ohio.

1,800 Feet of Dock.

6 McMyler Derricks.

Capacity 3,000 Tons Daily.

FUEL LIGHTERS.

"Kanawha"—"Pennsylvania"—"Hocking"

DOCKS

Pennsylvania R. R.

Hocking Valley R. R.

Toledo and Ohio Central R. R.

SMITH'S COAL DOCK

12 POCKETS.

PLATFORM.

LOW DOCK.

Operated by STANLEY B. SMITH & CO.,

Detroit River,

Detroit, Mich.

MARINE SUPPLY COMPANY. — STORE AND ICE HOUSE ON DOCK.

VESSEL AND INSURANCE AGENTS.

T. R. MCCARTHY,
STEAMSHIP and FREIGHT BROKER.
Chartering, Forwarding and General Commission
Agent; and Broker for the Sale, Purchase and
Construction of Steamers and Sailing
Vessels.
Marine and Fire Insurance Effected.
Cable address: "MACARTHY, MONTREAL."
(Watkins', Scott's, Lieber's and A. B. C. Codes
used.)
Shipping Agent to THE ASBESTOS & ASBESTIO
CO., Ltd., of Danville, Que.
6 St. Sacrament St. - - - - - Montreal, Can.
Correspondence invited and Agencies Solicited.

P. H. FLEMING & CO.

INSURANCE and VESSEL AGENTS
MARINE, FIRE, OCEAN, LIABILITY.
Telephone Harrison 1359
No. 2 Sherman Street - - CHICAGO, ILL.

C. W. ELPHICKE & CO.,
VESSEL AND INSURANCE AGENTS,
No. 6 Sherman St., OHIOGAGO, ILL.
Telephone, Harrison 1194.

W. A. HAWGOOD & CO.,
VESSEL AND INSURANCE AGENTS.

230-231 Perry-Payne Bldg., - - - CLEVELAND, O.
Office Telephone, Main 3395.
Residence Telephone, W. A. Hawgood, Doan 84-J.
Residence Telephone, Arthur H. Hawgood, Doan 841-J

John Mitchell. John F. Wedow. Alfred Mitchell.

MITCHELL & CO.,
VESSEL AND INSURANCE AGENTS,
508, 509 & 510 Perry-Payne Bldg.
Office Telephone, M 767. Residence, John Mitchell,
Doan, 841. John F. Wedow, Doan, 141-J.
Alfred Mitchell, Doan, 218.
CLEVELAND, - - - - - OHIO.

O. L. HUTCHINSON. **W. H. MCGEAN.**

HUTCHINSON & CO.,
VESSEL AND INSURANCE AGENTS,
Office Telephone, Main 2453.
Residence, O. L. Hutchinson, Ridge 345-L.
Residence, W. H. McGean, East 1421-J.
313-315 Perry-Payne Bldg., - - CLEVELAND, O.

W. C. RICHARDSON,
VESSEL OWNER and BROKER
and
MARINE INSURANCE AGENT,
490-491 Perry-Payne Bldg. - - CLEVELAND, O.
Office Telephone 338; Residence Telephone, 3988.

D. SULLIVAN. **F. J. SULLIVAN.**

D. SULLIVAN & CO.
VESSEL AGENTS.
MARINE INSURANCE.
2-4 Sherman Street, - - - - - CHICAGO, ILL.
Office Tel., Harrison 2847; Residence, Ashland 2483.

R. J. DUNHAM,
VESSEL AGENT. MARINE INSURANCE.
214 Sherman Street, - - - - - CHICAGO, ILL.
TELEPHONES:
Office, Harrison, 2630; Residence, Dearborn, 671.

John B. Hall. **Harry B. Root.**

HALL & ROOT,
VESSEL AGENTS.
21-23 Exchange Bldg, 202 Main Street.,
Telephone, Seneca, 692. BUFFALO, N. Y.

W. W. BROWN.
Member Cleveland Stock Exchange.
Buys and Sells all Kinds of Vessel Property.
1105-1106 Williamson Bldg., - - CLEVELAND, O.

JOHN J. BOLAND,
VESSEL AND INSURANCE AGENT.
25-26 Exchange Building, 202 Main St.
Telephone, Seneca, 115. BUFFALO, N. Y.

VESSEL AND INSURANCE AGENTS.

J. J. H. Brown. **J. B. Rodgers.** **Edward Smith.**

BROWN & CO.,
VESSEL AND INSURANCE AGENTS,
202 Main Street, - - - - - BUFFALO, N. Y.

D. T. HELM & CO.
VESSEL AND INSURANCE AGENTS.
Telephones—Office, 263
Res. 351-3.
DULUTH, - - - - - MINN.

SAMUEL HOLMES,
STEAMSHIP OFFICES, Morris Building.
68-68 Broad St.,
For Selling, Chartering and Building
all Classes Steam Vessels.
Steam Vessel Circulars. NEW YORK.
Weekly Freight Circulars.

RUFUS S. KING,
Commission Merchant and Broker

MARITIME BUILDING, 6-10 BRIDGE ST.,
Near Battery Park, NEW YORK.

Has the Largest List of Steamships and
Sailing Vessels for Sale in America,
Consequently Most Bargains.

Buying, Selling and Building of Steamships, Ships,
Yachts, Tugs, Steam Lighters, Schooners,
Barges, etc.
Expert on Valuation of Steam and Sailing Vessels.
CABLE ADDRESS, "RUFUS," WATKINS' CODE.
TELEPHONE, 3404 BROAD.

F. H. WEEKS,
MARINE BROKER,
Vessels Sold, Chartered, Built and Insured.
Cable Address, WEEKSHIP, New York.
Telephone, 2375 Broad. 22 Broadway, New York.

Charles F. Notman. **David H. E. Jones.**

JAMES W. ELWELL & CO.,
Established 1830.
SHIP BROKERS and STEAMSHIP AGENTS.
Sell and Charter all Classes of Vessels.
Agents for Cyprien Fabre & Cie. S. S. Line, Cie.
Havraise Peninsulair, and Northwestern S. S. Co.
Battery Park Bldg., 21-24 State St. NEW YORK.

PROCTORS IN ADMIRALTY.

**McPherson, Clark, Campbell &
Jarvis,**
Barristers-at-Law, Attorneys, Proctors in Admiralty.
(Trust and Guaranty Building)
16 King St. West, - - - - - TORONTO, CANADA.
ADMIRALTY AND MINING.
Telegraphic Address, "Clapher-Toronto."
(W. D. McPherson and J. M. Clark authors of
"The Law of Mines in Canada.")

RAY G. MACDONALD,
Attorney-at-Law and Proctor in Admiralty.
Suite 618 New York Life Building,
Telephone, Central 728. OHIOGAGO, ILL.

SHAW, WARREN, CADY & OAKES,
Attorneys-at-Law,
904 to 907 Union Trust Bldg.,...
Telephone, 685. DETROIT, MICH.

C. E. KREMER,
Counsellor at Law and
Proctor in Admiralty.
Suite 621-622 - - - - - New York Life Building.
OHIOGAGO - - ILL.

PROCTOR IN ADMIRALTY.

HARVEY L. BROWN,
PROCTOR IN ADMIRALTY.
25 White Building, - - - - - BUFFALO, N. Y.

HOYT, DUSTIN & KELLEY,
LAWYERS AND PROCTORS IN ADMIRALTY.
O.M.s., 708 Western Reserve Building,
CLEVELAND, - - - - - OHIO.

White, Johnson, McCaslin & Cannon,
ATTORNEYS-AT-LAW and
PROCTORS IN ADMIRALTY.
Williamson Building, - - - - - CLEVELAND, O.

GOULDER, HOLDING & MASTEN,
LAW OFFICES,
Harvey D. Goulder, S. H. Holding, Frank S. Masten.
Perry-Payne Building, - - - CLEVELAND, O.

ALBERT J. GILCHRIST,
PROCTOR IN ADMIRALTY.
604 Perry-Payne Building, - - - CLEVELAND, O.

O. C. Finney. **Dorr E. Warner.**

PINNEY & WARNER,
LAWYERS AND PROCTORS IN ADMIRALTY.
Rooms 216 and 217 Perry-Payne Building.
Telephone, Main 2635 - - - - - CLEVELAND, O.

H. R. SPENCER,
MARINE LAW,
BOARD OF TRADE BUILDING,
DULUTH, - - - - - MINN.

PROFESSIONAL.

W. J. WOOD, NAVAL ARCHITECT,
Consulting Engineer.

Prepares designs or working drawings and specifications for all classes of vessels and superintends construction and repairs. Surveys damaged property and estimates cost of repairs. Arbitrator and court expert.

Vessels designed—Twin S. S. Virginia, U. S. S. Frolic, formerly steam yacht Comanche, Twin S. S. North West and North Land, I. W. Nicholas, and many others, including Fire Boats, Tugs, Barges, etc.

Complete Plans Furnished For
Steel Composite or Wooden Vessels.
709 Rialto Building - - - - - CHICAGO.
Tel. Harrison 1089.

EDWARD GASKIN,
SHIP BUILDING EXPERT.

Plans and Specifications for Ships, Surveys and Estimates, superintendence, etc.
Ellicott Square, - - - - - BUFFALO, N. Y.

R. L. NEWMAN, Consulting Engineer,
Naval Architect.

SHIP AND YACHT BROKER.
Attention to development of designs and superintendence during construction. Vessels for carrying oil in bulk a specialty; also surveys on general repairs. Oil fuel systems for marine and land purposes developed under the patents of the International Oil Fuel Construction Company of New York.
817 Chesebrough Bldg., Bowling Green,
NEW YORK.

JOSEPH KIDD,
Marine Architect and Surveyor. Consulting Ship
Builder and Engineer.

Over thirty years' experience. Specifications, Designs and Estimates, Superintendence of Construction and Repairs. Damage and Other Surveys carefully attended to. Negotiations for the building, charter or sale of all kinds of vessels and machinery.

610 Board of Trade, - - - - - DULUTH, MINN.

PROFESSIONAL

AMBROSE V. POWELL, M. Am. Soc. C.E.

CIVIL ENGINEER,
Designs and Constructs Dry Docks,
Harbor Works, Docks and Plant for
Handling Coal and Ore, Foundations.

Office, 1008 Chamber of Commerce, CHICAGO, ILL.

Members Maritime Association Port of N. Y.

SADLER, PERKINS & FIELD

Naval Architects and Engineers.
Chartering and Brokerage.

Maritime Building, New York.

NEW YORK.

DETROIT.

H. MATTESON, JR.

GEO. B. DRAKE.

Matteson & Drake

Naval Architects and
Consulting Engineers

DESIGNING AND SUPERINTENDENCE
OF BUILDING AND REPAIRING
STEEL AND WOODEN VESSELS.

Bulk Oil Vessels a Specialty.

Agents for Marine Specialties.

690-692 Bourse. - - PHILADELPHIA.

ROBERT LOGAN,

Marine Architect, Mechanical
Draftsman, Consulting Engineer.

Specifications and designs for all descriptions
of Marine Vessels, Engines and Boilers,
Superintends Construction and Re-
pairs. Damage and other Sur-
veys carefully attended to.

810 Western Reserve Bldg. CLEVELAND, O.

CHARLES D. MOSHER,

NAVAL ARCHITECT AND ENGINEER,
No. 1 Broadway, NEW YORK.

**THE FASTEST YACHTS IN THE WORLD.**

Arrow, 45.06 miles per hr. Ellide, 40.3 miles per
hr. Feissen, 31.6 miles per hr. Norwood, 30.5
miles per hr. Presto, 31 miles per hr. Yankee
Doodle, 29.5 miles.

The Mosher Patent Triple and Quadruple Ex-
pansion Engines and Water-tube Boilers. These
boilers have been supplied for no less than eleven
of the torpedo boats of the U. S. Navy, the U. S.
Monitor, Florida and six torpedo boats for Russian
government, besides for numerous other fast yachts
and launches. Most powerful, lightest and com-
pact boiler made.

Pittsburgh Testing Laboratory, Ltd.,

INSPECTING AND METALLURGICAL
ENGINEERS AND CHEMISTS,

1750 Monadnock, 235 Water Street,
CHICAGO. PITTSBURGH,

908-7 Crozier Building, Philadelphia,
New York City, 60 New Street.

Richmond, Va., 1107 1-2 Main St.

Inspectors of Shipbuilding Materials and Machinery.
Inspectors located at all mills. Physical and Chem-
ical Laboratories. Tests of all kinds.

ROBERT W. HUNT & CO.

BUREAU OF INSPECTION.
TESTS AND CONSULTATION.

1121 The Rookery, Chicago.

Monong. Bank Bldg., Pittsburg.

66 Broadway, New York.

Inspectors of Shipbuilding Material and Machinery.
Inspectors of all Materials. Duty Tests of
Engines and Boilers. Physical and
Chemical Laboratories.

PATENTS.

E. L. Thurston.

Albert H. Bates.

THURSTON & BATES,

Counselors at Law in Patent Causes,
and Solicitors of Patents,
1028 Society for Savings Bldg., - CLEVELAND, O.

SCHWENCKE, KIRK & CO.,

Importers and Manufacturers of

DRAWING MATERIALS.

26 Church St, NEW YORK,
Factory, HOBOKEN, N. J.

**REED'S
ENGINEERS'
H A N D - B O O K .**

Seventh Edition.

Revised and Enlarged.
Including set of plates
and supplement contain-
ing New Elementary
Questions and Answers.

Price \$5.00

At office of

Marine Review Pub. Co.,

40 Wade Bldg., Cleveland, O.

By Express—45 Cents Extra.

HAWKINS'
EDUCATIONAL WORKS
FOR UP-TO-DATE ENGINEERS

Consisting of Seven Volumes On
STEAM, ELECTRICAL ENGINEERING
And MECHANICAL DRAWING.
A Set of Practical Books for
Practical Men PRICE \$12.
Terms \$1. Per Month.
CATALOG FREE Sent on Request
THEO. AUDEL & Co. 63-5TH AV.
NEW YORK

**GOODRICH
LINE
STEAMERS.**

**CHICAGO
To MILWAUKEE
GRAND RAPIDS
MUSKEGON and
GRAND HAVEN**

City Ticket Office 103 Adams St.
Docks Foot of Michigan Avenue

**Photographs of Marine
Scenes on the Great
Lakes. * * * * ***

Negative size of the following Photo-
graphs is 7x9 inches. Sent to any ad-
dress, postpaid at 75 cents each.

ASHTABULA, OHIO.

Harbor Entrance.
L. S. & M. S. Ry. Ore Docks.
L. S. & M. S. Ry. Ore Docks—unloading ore.
L. S. & M. S. Ry. Ore Docks—ore on docks.
Car Dumping Machine, two views.
Fueling Lighter with Clam Shell Hoist.

BUFFALO, N. Y.

Harbor Entrance.
City Ship Canal.
Great Northern Elevator and Shipping.
Great Northern Elevator—unloading grain.
River and Elevators.
River and Elevators, foot of Michigan St.
River and Elevators, foot of Main St.
C. & B. Line Freight Sheds.
Northern Steamship Co.'s Winter Quarters.
"An Old Timer" at C. T. T. Elevator.
Lackawanna Coal Chutes, two views.
Lackawanna Ore Docks—unloading ore.
Lackawanna Ore Docks—unloading ore and
loading coal.
Unloading Ore from Whaleback, two views.
Unloading Wheat into Elevators, two views.

CHICAGO, ILL.

Chicago River Elevators.
Lake Front, from Illinois Central Station.
Illinois Steel Works and Harbor Entrance,
South Chicago.

CLEVELAND, O.

Cleveland Harbor from Lake View Park.
American Steel & Wire Co.'s Plant.
Ellsworth Coal Chutes—Dumping Car, two views.
Cleveland & Pittsburg Ore Docks, two views.
Ore Docks and Harbor, two views.
Unloading Ore, two views.
Globe Iron Works Ship Yard.
Globe Iron Works Ship Yard, Laying Keel of
No. 400.

CONNEAUT, O.

Harbor Entrance.
Unloading Ore—Brown Conveying Hoists, two
views.
Unloading Ore—Clam Shell Plant.
Car Dumping Plant, two views.

DETROIT, MICH.

Winter in Detroit River.
Car Ferry turning in ice—two views.
"Michigan Central" entering slip.

DULUTH, MINN.

Great Northern Elevator.
Peavey Elevator.
Ship Canal (Looking in) Two views.
Ship Canal (Looking out.)
Flour Mills.
Northwestern Coal Docks.
Philadelphia & Reading Coal Docks.
The Harbor.
The Bluffs.
"Last Trip From Duluth."

ERIE, PA.

Anchor Line Docks and Pennsylvania R. R.
Co.'s Ore and Coal Docks.
Pennsylvania R. R. Coal Trestle.
Pennsylvania R. R. Co.'s Docks. Unloading Ore
Hanna's Ore Plant.
Coal Trestle and Car Dumping Plant.

OSWEGO, N. Y.

Coal and Ore Docks.

ST. CLAIR FLATS.

Str. Tashmoo Entering Ship Canal.
A Freighter Leaving Ship Canal.
Lake Vessels Old and New.
Nightfall on the River.
A Lumber Tow.

SAULT STE. MARIE, MICH.

General View of Locks from Offices.
Poe Lock, from below, closed.
Poe Lock, from below, open.
Poe Lock, from above.
Poe Lock, with Whaleback.
Weltzel Lock, from above.
Weltzel Lock, from below.
Str. North-Land Passing Locks, two views.
Upper Entrance to Lock Canal.
Gate Mechanism.
Interior of Power House.
Canadian Lock from Upper End.
Canadian Lock from Lower End.
The Rapids, looking up.
The Rapids, looking across.
Indians fishing in the rapids.

PANORAMIC VIEWS.—7x17 inches at \$1.75 each.

Lackawanna Ore Docks—Unloading ore.
American Steel & Wire Co.'s Plant, Cleveland.
Ore Docks and Harbor, Cleveland.
Ore Docks, Cleveland.
Water Front, Detroit, from Winsor.
Coal and Ore Docks at Oswego.

Address: MARINE REVIEW PUB. CO.,
39-41 Wade Bldg., Cleveland, Ohio.

BUYERS' DIRECTORY OF THE MARINE TRADE.

For a more complete classification than that represented by advertisers in the Marine Review and Marine Record, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by the Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland.

See accompanying Index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.

Chicago Pneumatic Tool Co.....Chicago
"Long Arm" System Co.....Cleveland.

AIR PUMPS AND APPLIANCES

Fore River Ship & Engine Co.....Quincy, Mass.

ANCHORS.

Beldt Anchor Co.....Chester, Pa.
Bowers, L. M. & Co.....Binghamton, N. Y.
DeGrauw, Aymar & Co.....New York.
Seaboard Steel Casting Co.....Chester, Pa.

ANTI-FRICTION METALS.

Cramp, Wm. & Sons.....Philadelphia.
Hardy, Wm. A.....Fitchburg, Mass.
Phosphor Bronze Smelting Co., Ltd.....Philadelphia.
Pittsburg White Metal Co.....Pittsburg, Pa.

ARTIFICIAL DRAFT FOR BOILED.

American Ship Building Co.....Cleveland.
Bloomsburg & Co., H.....Newport News, Va.
Detroit Shipbuilding Co.....Detroit.
Sturtevant, B. F. Co.....Boston.

ATTORNEYS AND PROCTORS IN ADMIRALTY.

Brown, Harvey L.....Buffalo.
Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Hoyt, Dustin & Kelley.....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
McPherson, Clark, Campbell & Jarvis.....Toronto.
Pinney & Warner.....Cleveland.
Shaw, Warren, Cady & Oakes.....Detroit.
Spencer, H. R.....Duluth.
White, Johnson, McCaslin & Cannon.....Cleveland.

BANKERS.

Fahey & Co.....Cleveland.
Federal Trust Co.....Cleveland.
Cleveland Trust Co.....Cleveland.

BAROMETERS, MARINE GLASSES, ETC.

Bliss, John & Co.....New York.
Ritchie, E. S. & Sons.....Brookline, Mass.

BELTING, RUBBER.

New York Belting & Packing Co.....New York.

BLOCKS, SHEAVES, ETC.

Boston & Lockport Block Co.....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.

Sturtevant, B. F. Co.....Boston.

BOAT BUILDERS.

Dreln, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Marine Iron Works.....Chicago.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

BOILER MANUFACTURERS.

Almy Water Tube Boiler Co.....Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Babcock & Wilcox Co.....New York.
Bath Iron Works, Ltd.....Bath, Me.
Boyer's Sons, L.....New York.
Chicago Ship Building Co.....Chicago.
Clyde Machine Works.....Chicago.
Columbia Iron Works.....Port Huron.
Cramp, Wm. & Sons.....Philadelphia.
Crescent Ship Yard Co.....Elizabethport, N. J.
DeLauney Belleville & Co.....St. Denis, France.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Forest City Boiler Co.....Cleveland.
Jenks Ship Building Co.....Port Huron, Mich.
Kingsford Foundry & Machine Works Oswego, N. Y.
MacKinnon Mfg. Co.....Bay City, Mich.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Mosher, Chas. D.....New York.
Noad & Levy Ship & Engine Building Co.....Phila.
Newport News Ship Building Co Newport News, Va.
Pusey & Jones Co.....Wilmington, Del.
Risdon Iron Works.....San Francisco.
Roberts Safety Water Tube Boiler Co.....New York.
Stirling, The Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.
Union Machine & Boiler Co.....Cleveland.
United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

BOILER COMPOUNDS.

Dearborn Drug & Chemical Works.....Chicago.

BOILER RIVETS.

Bourne-Fuller Co.....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co.....Quincy, Mass.
Lunkenheimer Co.....Cincinnati.
Macbeth Iron Co.....Cleveland.
Phosphor Bronze Smelting Co.....Philadelphia.

BRASS—SHEET, ROD, ETC.

Waterbury Brass Co.....New York.

BRASS WORK, MARINE.

Farnan Brass Works.....Cleveland.

BRIDGES, BUILDERS OF

Scherzer Rolling Lift Bridge Co.....Chicago.

BUCKETS, ORE AND COAL.

Bartlett & Snow Co., C. O.....Cleveland.
Brown Holsting & Conveying Machine Co. Cleveland.
Wellman-Seaver-Morgan Co.....Cleveland.

CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co.....Cleveland.

CAPSTANS.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co.....Bath, Me.

CEMENT, IRON FOR REPAIRING LEAKS.

Smoot-On Mfg. Co.....Jersey City, N. J.

CHAINS.

Standard Chain Co.....Pittsburg.

CHAIN HOISTS.

Boston & Lockport Block Co.....Boston, Mass.
Deke Engine Co.....Grand Haven, Mich.

CHARTS.

Marine Review Pub. Co.....Cleveland.
Potter, J. D.....London.

CIRCULATOR, EQUILIBRIUM.

With Steam Heating Attachment.

Bloomsburg & Co., H.....Baltimore, Md.

CLOCKS (Maine), CHRONOMETERS, BELLS.

Ashton Valve Co.....Boston.
Bliss, John & Co.....New York.
Chelsea Clock Co.....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.

COAL PRODUCERS AND SHIPPERS.

Castner, Curran & Bullitt.....Boston.
Graham Coal & Coke Co., Ltd.....Detroit.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Rochester & Pittsburg Coal & Iron Co.....Buffalo.

COAL AND ORE HANDLING MACHINERY.

Bartlett & Snow Co., C. O.....Cleveland.
Brown Holsting Machinery Co., (Inc.).....Cleveland.
Lidgerwood Mfg. Co.....New York.
Wellman-Seaver-Morgan Co.....Cleveland.

COMPASSES.

Bliss, John & Co.....New York.
Ritchie, E. S. & Sons.....Brookline, Mass.

COMPASS ADJUSTER.

Fields, Capt. J. M.....Cleveland.

CONTRACTORS FOR PUBLIC WORKS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co.....Chicago.
Lake Erie Dredging Co.....Buffalo.
Smith Co., L. P. & J. A.....Cleveland.

COPPER, TIN AND SHEET IRON WORK.

Lake Erie Boiler Works.....Cleveland.
McCutcheon, C. H.....Buffalo.

COPPER—SHEET, TUBES AND ROD.

Waterbury Brass Co.....New York.

CORDAGE

Baker & Co., H. H.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.

Armstrong Cork Co.....Pittsburg, Pa.
Kahnweiler's Sons, D.....New York.
Lane & DeGroot.....Long Island City, N. Y.

CHAIN CONVEYORS, HOISTS.

Bartlett & Snow Co., C. O.....Cleveland.
Brown Holsting Machinery Co., (Inc.).....Cleveland.
Chicago Pneumatic Tool Co.....Chicago.
General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

DEAD-LIGHTS, AIR-PORTS, ETC.

"Long-Arm" System Co.....Cleveland.

DIVING APPARATUS.

Morse, A. J. & Son.....Boston.
Schrader's Son, A.....New York.

DOORS, WATER TIGHT, ETC.

"Long-Arm" System Co.....Cleveland.

DRAWING MATERIALS.

Schwencke, Kirk & Co.....New York.

DREDGE ENGINES FOR HANDLING DUMP SCOW LINES.

Superior Iron Works.....West Superior, Wis.

DREDGING CONTRACTORS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co.....Chicago.
Lake Erie Dredging Co.....Buffalo.
Smith Co., L. P. & J. A.....Cleveland.

DRILL PRESSES—DRILLS OF ALL KINDS

Cleveland Punch & Shear Works Co.....Cleveland.
Railway Appliances Co.....Chicago.

DRYING APPARATUS.

Sturtevant, B. F. Co.....Boston.

DRY DOCKS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Crescent Ship Yard Co.....Elizabethport, N. J.
Detroit Ship Building Co.....Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Marine Construction & Dry Dock Co.....New York.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Newport News Ship Building Co Newport News, Va.
Pusey & Jones Co.....Wilmington, Del.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
United States Ship Building Co.....New York.

ELECTRIC HOISTS AND CRANES.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

ELECTRIC LIGHT AND POWER PLANTS.

Electro-Dynamic Co.....Philadelphia.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Boston.
Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

ELECTRIC STEERING GEAR, SPEED AND RUDDER INDICATORS, ETC.

Electro-Dynamic Co.....Philadelphia.

ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Buffalo Forge Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Chase Machine Co.....Cleveland.
Columbia Iron Works.....Port Huron.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Crescent Ship Yard Co.....Elizabethport, N. J.
Deke Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

ENGINE BUILDERS, MARINE.—Continued.

Fletcher, W. & A. Co. Hoboken, N. J.
 Fore River Ship & Engine Co. Quincy, Mass.
 Great Lakes Engineering Works. Philadelphia.
 Hall Bros. Port Huron, Mich.
 Jenks Ship Building Co. East Boston, Mass.
 Lockwood Mfg. Co. Bay City, Mich.
 Mackinnon Mfg. Co. Sparrow's Point, Md.
 Maryland Steel Co. Milwaukee.
 Milwaukee Dry Dock Co. Milwaukee.
 Moran Bros. Co. Seattle, Wash.
 Mosher, Chas. D. New York.
 Neff & Levy Ship & Engine Building Co. Phila.
 Newport News Ship Building Co. Newport News, Va.
 Pusey & Jones Co. Wilmington, Del.
 Risdon Iron Works. San Francisco.
 Roach's Ship Yard. Chester, Pa.
 Thropp, J. E. & Sons Co. Trenton, N. J.
 Sheriffs Mfg. Co. Milwaukee.
 Superior Ship Building Co. Superior, Wis.
 Trout, H. G. Buffalo.
 United States Ship Building Co. New York.
 Warrington Iron Works. Chicago.
 Willard, Chas. P. & Co. Chicago.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son. New York.
 Electro-Dynamic Co. Philadelphia.
 MacLean Hydraulic Signal Co. Chicago.

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co. Chicago.
 Farnan Brass Works. Cleveland.
 Kieley & Mueller. New York.
 Lunkenheimer Co. Cincinnati.
 McCutcheon, C. H. Buffalo.
 New York Belting & Packing Co. New York.
 Reilly Repair & Supply Co., James. New York.

ENGINEERS, MARINE, MECHANICAL,
CONSULTING.

Electro-Dynamic Co. Philadelphia.
 Garrett-Cromwell Engineering Co. Cleveland.
 Gaskin, Edward. Buffalo.
 Hunt, Robt. W. & Co. Chicago.
 Kidd, Joseph. Duluth, Minn.
 Logan, Robert. Cleveland.
 Matteson & Drake. Philadelphia.
 Mosher, Chas. D. New York.
 Newman, R. L. New York.
 Pittsburg Testing Laboratory, Ltd. Pittsburg.
 Powell, Ambrose V. Chicago.
 Roelker, H. B. New York.
 Sadler, Perkins & Field. New York.
 Wood, W. J. Chicago.

EVAPORATING AND DISTILLING APPARATUS.

Reilly Repair & Supply Co., James. New York.

FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co. Boston.

FEED WATER PURIFIERS AND HEATERS.

Learmonth, Robert. Buffalo.
 Reilly Repair & Supply Co., James. New York.
 Ross Valve Co. Troy, N. Y.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co. Schenectady, N. Y.
 Westinghouse Electric & Mfg. Co. Pittsburg, Pa.

FORGES.

Sturtevant, B. F. Co. Boston.

FORGINGS FOR CRANK, PROPELLER OR
THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co. Cleveland.
 Fore River Ship & Engine Co. Quincy, Mass.
 Macbeth Iron Co. Cleveland.

FLUE WELDING.

Fix's, S. Sons. Cleveland.

FURNACES FOR BOILERS.

Continental Iron Works. New York.

FUELING COMPANIES AND COAL DEALERS.

Castner, Curran & Bullitt (Pocahontas). Phila.
 Graham Coal & Coke Co., Ltd. Detroit.
 Hanna, M. A. & Co. Cleveland.
 Pickands, Mather & Co. Cleveland.
 Pittsburg Coal Co. Cleveland.
 Rochester & Pittsburg Coal & Iron Co. Buffalo.
 Smith, Stanley B. & Co. Detroit.
 Smith Coal & Dock Co., Stanley B. Toledo, O.
 Youghiogheny & Lehigh Valley Coal Co. Chicago.

GASKETS, RUBBER.

New York Belting & Packing Co. New York.

GAS BUOYS.

Safety Car Heating & Lighting Co. New York.

GAS AND GASOLINE ENGINES.

Chase Machine Co. Cleveland.

GAUGES, STEAM AND VACUUM.

American Steam Gauge Co. Boston.
 Ashton Valve Co. Boston.
 Lunkenheimer Co. Cincinnati.

GRAPHITE.

Dixon Crucible Co., Joseph. Jersey City, N. J.
 United States Graphite Co. Saginaw, Mich.

HAMMERS, STEAM.

Chase Machine Co. Cleveland.

HATCH GEARS.

"Long-Arm" System Co. Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co. Boston.

HOISTS FOR CARGO, ETC.

American Ship Building Co. Cleveland.
 Brown Hoisting Machinery Co., (Inc.). Cleveland.
 Chase Machine Co. Cleveland.
 Elwell-Parker Electric Co. Cleveland.
 General Electric Co. New York.
 Hyde Windlass Co. Bath, Me.
 Lidgerwood Mfg. Co. New York.
 Marine Iron Co. Bay City.
 Westinghouse Electric & Mfg. Co. Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co. Cuyahoga Falls, O.

HOSE FITTINGS.

Farnan Brass Works. Cleveland.

HOSE, RUBBER.

New York Belting & Packing Co. New York.

HYDRAULIC MACHINERY.

Watson-Stillman Co., The. New York.

ICE MACHINERY.

American Linde Refrigerating Co. New York.
 Roelker, H. B. New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co. Boston.
 Ashton Valve Co. Boston.

INJECTORS.

American Injector Co. Detroit.
 Crane Co. Chicago.
 Jenkins Bros. New York.
 Lunkenheimer Co. Cincinnati.
 Penberthy Injector Co. Detroit, Mich.

INSURANCE, MARINE.

Brown & Co. Buffalo.
 Brown, W. W. Cleveland.
 Dunham, R. J. Chicago.
 Elphicke, C. W. & Co. Chicago.
 Fleming & Co., P. H. Chicago.
 Hawgood & Co., W. A. Cleveland.
 Helm & Co., D. T. Duluth.
 Hutchinson & Co. Cleveland.
 McCarthy, T. R. Montreal.
 McCurdy, Geo. L. Chicago.
 Mitchell & Co. Cleveland.
 Peck, Chas. E. & W. F. New York and Chicago.
 Richardson, W. C. Cleveland.
 Sullivan, D. & Co. Chicago.
 Weeks, F. H. New York.

IRON ORE AND PIG IRON.

Bourne-Fuller Co. Cleveland.
 Hanna, M. A. & Co. Cleveland.
 Pickands, Mather & Co. Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Marine Construction & D. D. Co.
 Mariner's Harbor, S. I., N. Y.
 Truscott Boat Mfg. Co. St. Joseph, Mich.
 Warrington Iron Works. Chicago.
 Willard, Chas. P. Chicago.

LIFE FLOATS.

Carley Life Float Co. New York.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong Cork Co. Pittsburg.
 Drein, Thos. & Son. Wilmington, Del.
 Kahnweiler's Sons, D. New York.
 Lane & DeGroot. Long Island City, N. Y.
 Marine Construction & Dry Dock Co.
 Mariner's Harbor, S. I., N. Y.

LIGHTS, SIDE AND SIGNAL.

Helvig, H. A. J. New York.
 Russell & Watson. Buffalo.

LOGS.

Bliss, John & Co. New York.
 Negus, T. S. & J. D. New York.
 Nicholson Ship Log Co. Cleveland.
 Walker & Sons, Thomas. Birmingham, Eng.
 Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph. Jersey City, N. J.
 United States Graphite Co. Saginaw, Mich.

LUMBER.

Martin-Barriss Co. Cleveland.
 Moran Bros. Co. Seattle, Wash.
 Shurick, F. S. New York.

MACHINISTS.

Chase Machine Co. Cleveland.
 Macbeth Iron Co. Cleveland.
 Union Machine & Boiler Co. Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc. Philadelphia.

MAN-HOLES, SWING DOORS, ETC.

"Long-Arm" System Co. Cleveland.

MARINE RAILWAYS, BUILDERS OF

Crandall & Son, H. I. East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W. New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co. Cleveland.
 Bloomsburg & Co., H. Baltimore, Md.
 Detroit Ship Building Co. Detroit.
 Sturtevant, B. F. Co. Boston.

METALLIC PACKING.

Hayden Mfg. Co., N. L. Columbus, O.
 Katzenstein, L. & Co. New York.
 U. S. Metallic Packing Co. Philadelphia.

METAL POLISH.

Bertram's Oil Polish Co. Boston.

MOTORS, GENERATORS—ELECTRIC.

Electro-Dynamic Co. Philadelphia.
 Elwell-Parker Electric Co. Cleveland.
 General Electric Co. Schenectady, N. Y.
 "Long-Arm" System Co. Cleveland.
 Sturtevant, B. F. Co. Boston.
 Westinghouse Electric & Mfg. Co. Pittsburg, Pa.

NAUTICAL INSTRUMENTS.

Bliss, John & Co. New York.
 Negus, T. S. & J. D. New York.
 Ritchie, E. S. & Sons. Brookline, Mass.

NAVAL ARCHITECTS.

Gaskin, Edward. Buffalo.
 Kidd, Joseph. Duluth, Minn.
 Logan, Robert. Cleveland.
 Matteson & Drake. Philadelphia.
 Mosher, Chas. D. New York.
 Newman, R. L. New York.
 Sadler, Perkins & Field. New York.
 Wood, W. J. Chicago.

OAKUM.

DeGrauw, Aymar & Co. New York.
 Stratford Oakum Co. Jersey City, N. J.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph. Jersey City, N. J.
 Standard Oil Co. Cleveland.
 United States Graphite Co. Saginaw, Mich.

PACKING.

Crane Co. Chicago.
 Hayden Mfg. Co., N. L. Columbus, O.
 Jenkins Bros. New York.
 Katzenstein, L. & Co. New York.
 New York Belting & Packing Co. New York.
 United States Metallic Packing Co. Philadelphia.

PAINTS.

Baker, Howard H. & Co. Buffalo.
 Berry Bros., Ltd. Detroit.
 Mohawk Paint & Chemical Co. Norwich, Conn.
 New Jersey Zinc Co. New York.
 United States Graphite Co. Saginaw, Mich.
 Upson-Walton Co. Cleveland.

PATENT ATTORNEYS.

Thurston & Bates. Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc. Philadelphia.

PIPE—BRASS AND COPPER, IRON PIPE SIZE.

Waterbury Brass Co. New York.

PIPE-JOINT COMPOUND.

United States Graphite Co. Saginaw, Mich.

PIPE, WROUGHT IRON.

Bourne-Fuller Co. Cleveland.
 Crane Co. Chicago.
 Macbeth Iron Co. Cleveland.

PLANING MILL MACHINERY.

Atlantic Works, Inc. Philadelphia.

PLUMBING, MARINE.

Mett, J. L., Iron Works. New York.
 Reilly Repair & Supply Co., James. New York.
 Sands, Alfred B. & Son. New York.

PNEUMATIC TOOLS.

Allen, John F. New York.
 Chicago Pneumatic Tool Co. Chicago.

POLISH FOR METALS.

Bertram's Oil Polish Co. Boston.

POWER DOORS AND HATCHES.

"Long-Arm" System Co. Cleveland.

PRESSURE REGULATORS.

Kieley & Mueller. New York.
 Ross Valve Co. Troy, N. Y.

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

PROPELLER WHEELS.

American Ship Building Co. Cleveland.
 Atlantic Works, Inc. East Boston, Mass.
 Bath Iron Works, Ltd. Bath, Me.
 Cramp, Wm. & Sons. Philadelphia.
 Crescent Ship Yard Co. Elizabethport, N. J.
 Detroit Ship Building Co. Detroit.
 Fore River Ship & Engine Co. Quincy, Mass.
 Great Lakes Engineering Works. Detroit.
 Hyde Windlass Co. Bath, Me.
 Jenks Ship Building Co. Port Huron, Mich.
 Lockwood Mfg. Co. East Boston, Mass.
 Macbeth Iron Co. Cleveland.
 MacKinnon Mfg. Co. Bay City, Mich.
 Maryland Steel Co. Sparrow's Point, Md.
 Milwaukee Dry Dock Co. Milwaukee.
 Moran Bros. Co. Seattle, Wash.
 Neale & Levy Ship & Engine Building Co. Phila.
 Newport News Ship Building Co. Newport News, Va.
 Phosphor Bronze Smelting Co., Ltd. Philadelphia.
 Pusey & Jones Co. Wilmington, Del.
 Risdon Iron Works. San Francisco.
 Roelker, H. B. New York.
 Sheriffs Mfg. Co. Milwaukee.
 Superior Ship Building Co. Superior, Wis.
 Tropp & Sons Co., J. E. Trenton, N. J.
 Trout, H. G. Buffalo.
 United States Ship Building Co. New York.

PROJECTORS, ELCTERIC.

Elwell-Parker Electric Co. Cleveland.
 General Electric Co. Schenectady, N. Y.
 Westinghouse Electric & Mfg. Co. Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co. New York.
 Clyde Machine Works. Chicago.
 Great Lakes Engineering Works. Detroit.
 Kingsford Foundry & Machine Wks. Oswego, N. Y.
 "Long-Arm" System Co. Cleveland.

PUNCHES, RIVETERS, SHEARS.

Chicago Pneumatic Tool Co. Chicago.

REFRIGERATING APPARATUS.

Roelker, H. B. New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register Cleveland.
 Record of American & Foreign Shipping. New York.

RELEASING HOOKS FOR DETACHING BOATS.

Standard Automatic Releasing Hook Co. New York.

RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co. Cleveland.

RANGES.

Russell & Watson Buffalo.

RIVETS—BRASS AND COPPER.

Waterbury Brass Co. New York.

RUBBER INSULATED WIRES.

Reebing's Sons, Jno. A. New York and Cleveland.

SAFETY VALVES.

American Steam Gauge Co. Boston.
 Ashton Valve Co. Boston.
 Hayden Mfg. Co., N. L. Columbus, O.
 Lunkenheimer Co. Cincinnati.

SAIL MAKERS.

Raker, Howard H. & Co. Buffalo.
 Upson-Walton Co. Cleveland.
 Wilson & Silsby Boston.

SALVAGE COMPANIES.

See Wrecking Companies.

SEARCH LIGHTS.

Elwell-Parker Electric Co. Cleveland.
 General Electric Co. Schenectady, N. Y.
 Westinghouse Electric & Mfg. Co. Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co. Cleveland.

SHIP BUILDERS.

American Ship Building Co. Cleveland.
 Atlantic Works, Inc. East Boston, Mass.
 Bath Iron Works, Ltd. Bath, Me.
 Buffalo Dry Dock Co. Buffalo.
 Columbia Iron Works. Port Huron.
 Cramp, Wm. & Sons. Philadelphia.
 Craig Ship Building Co. Toledo, O.

Chicago Ship Building Co. Chicago.
 Crescent Ship Yard Co. Elizabethport, N. J.
 Detroit Ship Building Co. Detroit.
 Fore River Ship & Engine Co. Quincy, Mass.
 Great Lakes Engineering Works. Detroit.
 Jenks Ship Building Co. Port Huron, Mich.
 Lockwood Mfg. Co. East Boston, Mass.
 Manitowoc Dry Dock Co. Manitowoc, Wis.
 Marine Construction & Dry Dock Co.
 Mariner's Harbor, S. I., N. Y.
 Maryland Steel Co. Sparrow's Point, Md.
 Milwaukee Dry Dock Co. Milwaukee.
 Moran Bros. Co. Seattle, Wash.
 Neale & Levy Ship & Engine Building Co. Phila.
 Newport News Ship Building Co. Newport News, Va.
 Pusey & Jones Co. Wilmington, Del.
 Risdon Iron Works. San Francisco.
 Rench's Ship Yard. Chester, Pa.
 Shipowners Dry Dock Co. Chicago.
 Smith & Son, Abram. Algonac, Mich.
 United States Ship Building Co. New York.
 Warrington Iron Works. Chicago.
 Willard, Chas. P. & Co. Chicago.

SHIP CHANDLERS.

Baker, Howard H. & Co. Buffalo.
 Moran Bros. Co. Seattle, Wash.
 Reilly Repair & Supply Co., James. New York.
 Upson-Walton Co. Cleveland.

SHIP LANTERNS AND LAMPS.

Holvig, H. A. J. New York.
 Russell & Watson Buffalo.

SHIP TIMBER.

Martin-Barriss Co. Cleveland.
 Moran Bros. Co. Seattle, Wash.
 Shurlock, F. S. New York.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co. Jersey City, N. J.

SPARS—LARGE SIZES.

Moran Bros. Co. Seattle, Wash.

STAYBOLTS, IRON OR STEEL, HOLLOW, OR SOLID.

Falls Hollow Staybolt Co. Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co. New York.
 Holmes, Samuel. New York.
 King, Rufus S. New York.
 McCarthy, T. R. Montreal, Can.
 Newman, R. L. New York.
 Weeks, F. H. New York.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line New York.
 Cleveland & Buffalo Transit Co. Cleveland.
 Erie & Western Trans. Co. Buffalo.
 Goodrich Trans. Co. Chicago.
 International Nav. Co. Philadelphia.
 Pere Marquette R. R. & S. S. Line. Milwaukee.
 Red Star Line New York.

STEEL CASTINGS.

Seaboard Steel Casting Co. Chester, Pa.
 Macbeth Iron Co. Cleveland.

STEERING APPARATUS.

American Ship Building Co. Cleveland.
 Chase Machine Co. Cleveland.
 Duke Engine Co. Grand Haven, Mich.
 Detroit Ship Building Co. Detroit.
 Electro-Dynamile Co. Philadelphia.
 Hyde Windlass Co. Bath, Me.
 Jenks Ship Building Co. Port Huron, Mich.
 Sheriff Mfg. Co. Milwaukee.

STOCKS, BONDS, SECURITIES.

Brown, W. W. Cleveland.
 Fahey & Co. Cleveland.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J. Boston.
 Schrader's Son, A. New York.

SURVEYORS, MARINE.

Gaskin, Edward. Buffalo.
 Matteson & Drake. Philadelphia.
 Newman, R. L. New York.
 See, Horace. New York.
 Wood, W. J. Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co. Chicago.
 Pittsburg Testing Laboratory Ltd. Pittsburg.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co. New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F. New York.
 Chicago Pneumatic Tool Co. Chicago.
 Watson-Stillman Co. New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc. Philadelphia.

TOWING MACHINES.

American Ship Windlass Co. Providence, R. I.
 Chase Machine Co. Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co. Kingston, Ont.
 Midland Towing & Wrecking Co., Ltd. Midland, Ont.

TRAPS, STEAM.

Kieley & Mueller New York.
 Lunkenheimer Co. Cincinnati.

TRUCKS.

Boston & Lockport Block Co. Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co. Pittsburg, Pa.
 Waterbury Brass Co. New York.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. Boston.
 Ashton Valve Co. Boston.
 Bordo, L. J. Philadelphia.
 Crane Co. Chicago.
 Farnam Brass Works. Cleveland.
 Hayden Mfg. Co., N. L. Columbus, O.
 Jenkins Bros. New York.
 Kieley & Mueller New York.
 Lunkenheimer Co. Cincinnati.
 Ross Valve Co. Troy, N. Y.

VALVES FOR WATER AND GAS.

Ross Valve Co. Troy, N. Y.

VARNISHES.

Berry Brothers, Ltd. Detroit.
 New Jersey Zinc Co. New York.
 Also Ship Chandlers.

VESSEL AND FREIGHT AGENTS.

Boland, John J. Buffalo.
 Brown & Co. Buffalo.
 Brown, W. W. Cleveland.
 Dunham, R. J. Chicago.
 Elwell, Jas. W. & Co. New York.
 Elphicke, C. W. & Co. Chicago.
 Fleming & Co., P. H. Chicago.
 Hall & Root. Buffalo.
 Helm & Co., D. T. Duluth.
 Hawgood & Co., W. A. Cleveland.
 Holmes, Samuel. New York.
 Hutchinson & Co. Cleveland.
 King, Rufus S. New York.
 McCarthy, T. R. Montreal.
 Newman, R. L. New York.
 Mitchell & Co. Cleveland.
 Richardson, W. C. Cleveland.
 Sullivan, D. & Co. Chicago.
 Weeks, F. H. New York.

VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co. Boston.

WIRE—BRASS AND COPPER.

Waterbury Brass Co. New York.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co. Buffalo.
 DeGrauw, Aymar & Co. New York.
 Upson-Walton Co. Cleveland.

WHISTLES, STEAM.

American Steam Gauge Co. Boston.
 Ashton Valve Co. Boston.
 Farnam Brass Works. Cleveland.
 Lunkenheimer Co. Cincinnati.

WHITE METAL—SHEETS, RODS AND WIRE.

Waterbury Brass Co. New York.

WINDLASSES.

American Ship Windlass Co. Providence, R. I.
 American Ship Building Co. Cleveland.
 Hyde Windlass Co. Bath, Me.
 Jenks Ship Building Co. Port Huron, Mich.

WINCHES.

American Ship Windlass Co. Providence, R. I.
 Hyde Windlass Co. Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc. Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co. Kingston, Ont.
 Midland Towing & Wrecking Co., Ltd. Midland, Ont.

YACHT AND BOAT BUILDERS.

Dreln, Thos. & Son Wilmington, Del.
 Lane & DeGroot Long Island City, N. Y.
 Marine Construction & Dry Dock Co. New York.
 Truscott Boat Mfg. Co. St. Joseph, Mich.
 Warrington Iron Works. Chicago.
 Willard, Chas. P. & Co. Chicago.

YAWLS.

Dreln, Thos. & Son Wilmington, Del.
 Lane & DeGroot Long Island City, N. Y.

ALPHABETICAL INDEX OF ADVERTISERS IN THE
MARINE REVIEW AND MARINE RECORD.

The star (*) indicates that the advertisement appears alternate weeks. For addresses see advertisements on pages noted.

*Allen, John F. 11	Dixon Crucible Co., Joseph..... 12	Lake Erie Boiler Works..... 14	*Reilly Repair & Supply Co., Jas. 9
Almy Water Tube Boiler Co.... 15	Donnelly Salvage & Wrecking Co. 7	Lake Erie Dredging Co..... 37	Ridson Iron Works..... 5
American Injector Co..... 10	Dreln, Thos. & Son..... 4	Lane & DeGroot..... 4	*Ritchie & Sons, E. S..... 14
American Line..... 13	Dunham, R. J..... 40	*Learmonth, Robert..... 3	Roach's Ship Yard..... 5
American Ship Building Co..... 1		Lidgerwood Mfg. Co..... 6	Roberts Water Tube Boiler Co.. 15
American Ship Masters Ass'n. 6		Lockwood Mfg. Co..... 5	Rochester & Pittsburg Coal &
American Ship Windlass Co.... 2		Logan, Robert..... 41	Iron Co..... 30
American Steam Gauge Co..... 1		*"Long-Arm" System Co..... 1	Roelker, H. B..... 5
Anchor Line..... 45		L. S. & M. S. Ry..... 45	Ross Valve Co..... 12
Armstrong Cork Co..... 48		Lunkenheimer Co..... 12	Russell & Watson..... 6
Ashton Valve Co..... 16			
Atlantic Works..... 5			
*Atlantic Works, Inc..... 11			
Babeock & Wilcox Co..... 15			
Baldt Anchor Co..... 9			
Baker, Howard H. & Co..... 48			
Bartlett & Snow Co., O. O..... 2			
Bath Iron Works, Ltd..... 1			
Bertram's Oil Polish Co..... 1			
Berry Brothers, Ltd..... 10			
Blake, Geo. F., Mfg. Co..... 9			
*Bliss, John & Co..... 13			
*Bloomsburg & Co., H..... 9			
Boland, J. J..... 40			
Bordo, L. J..... 9			
*Boston & Lockport Block Co.... 32			
Bourne-Fuller Co..... 16			
Bowers, L. M. & Co..... 9			
*Boyer's, L. Sons..... 48			
Brown, Harvey L..... 40			
Brown & Co..... 40			
Brown Holsting Machinery Co.,			
Inc..... 2			
Brown, W. W..... 40			
Buffalo Dredging Co..... 37			
Buffalo Dry Dock Co..... 46			
Castner, Curran & Bullitt..... 39			
Chase Machine Co..... 8			
*Chelsea Clock Co..... 3			
Chicago & Gt. L. Dredge & Dock Co. 37			
Chicago Pneumatic Tool Co..... 16			
Chicago Ship Building Co..... 46			
Cleveland & Buffalo Transit Co.. 45			
Cleveland City Forge & Iron Co.. 48			
Cleveland Trust Co..... 38			
Columbia Iron Works..... 5			
Continental Iron Works..... 2			
Cory, Chas. & Son..... 13			
*Craig Ship Building Co..... 13			
Cramp, Wm. & Sons, S. & E.			
B. Co..... 1			
*Crandall & Son, H. I..... 11			
Crane Co..... 47			
Crescent Ship Yard Co..... 4			
Dake Engine Co..... 12			
Dearborn Drug & Chemical Wks. 14			
DeGrauw, Aymer & Co..... 9			
Delauney, Belleville & Co..... 30			
Delaware River Iron S. B. &			
E. Works..... 5			
Detroit Ship Building Co..... 1			
Fahey & Co..... 30			
Falls Hollow Staybolt Co..... 4			
Farnan Brass Works..... 12			
Federal Trust Co..... 36			
Felds, Capt. J. M..... 37			
Fix's S., Sons..... 37			
Fleming & Co., P. H..... 40			
Fletcher, W. & A. Co..... 4			
Fogg, M. W..... 38			
Fore River Ship & Engine Co.... 5			
Forest City Boiler Co..... 37			
Garrett-Cromwell Engineering Co. 3			
Gaskin, Edward..... 41			
General Electric Co..... 16			
Gilchrist, Albert J..... 40			
Goodrich Trans. Co..... 41			
Goulder, Holding & Masten..... 10			
Graham Coal & Coke Co..... 38			
Great Lakes Engineering Works. 34			
Great Lakes Register..... 7			
Hall & Root..... 40			
Hanna, M. A. & Co..... 38			
Hardy, Wm. A..... 14			
Hawgood & Co., W. A..... 40			
Hayden Mfg. Co., N. L..... 37			
Helm & Co., D. T..... 40			
Holvig, H. A. J..... 3			
Herriman, F. D..... 7			
Holmes, Samuel..... 40			
Hoyt, Dustin & Kelley..... 40			
Hunt, Robert W. & Co..... 41			
Hutchinson & Co..... 40			
Hyde Windlass Co..... 48			
International Navigation Co. 13			
Jenkins Brothers..... 16			
Jenks Ship Building Co..... 47			
Kahnweiler's Sons, David..... 4			
Katzenstein, L. & Co..... 3			
Kidd, Joseph..... 40			
*Kiley & Mueller..... 14			
Kingsford Foundry & Machine			
Works..... 18			
King, Rufus S..... 40			
Kremer, C. E..... 40			
McCarthy, T. B..... 40			
McCurdy, Geo. L..... 7			
McCutcheon, C. H..... 11			
McPherson, Clark, Campbell &			
Jarvis..... 40			
Macbeth Iron Co..... 48			
Macdonald, Ray G..... 40			
MacKinnon Mfg. Co..... 8			
MacLean Hydraulic Signal Co..... 6			
Manitowoc Dry Dock Co..... 5			
Marine Construction & Dry			
Dock Co..... 5			
*Marine Iron Co..... 38			
Martin-Barriss Co..... 9			
Maryland Steel Co..... 5			
Matteson & Drake..... 41			
Midland Towing & Wrecking			
Co., Ltd..... 48			
Millwaukee Dry Dock Co..... 46			
Mitchell & Co..... 40			
Mohawk Paint & Chemical Co... 7			
*Moran Bros. Co..... 47			
Morse & Son, A. J..... 38			
Mosher, Chas. D..... 41			
*Mott, J. L., Iron Works..... 13			
Neale & Levy Co..... 4			
Negus T. S. & J. D..... 13			
Newman, R. L..... 40			
Newport News Ship Building &			
Dry Dock Co..... 7			
New Jersey Zinc Co..... 7			
New York Belting & Packing Co. 10			
Nicholson Ship Log Co..... 3			
North River Iron Works..... 4			
Peck, Chas. E. & W. F..... 7			
Penberthy Injector Co..... 10			
Pere Marquette R. R. & S. S.			
Line..... 45			
Phosphor Bronze Smelting Co.			
Ltd..... 14			
Pickands, Mather & Co..... 38			
Pinney & Warner..... 40			
Pittsburg Coal Co..... 39			
Pittsburg Testing Laboratory, Ltd. 41			
Pittsburg White Metal Co..... 33			
Potter, J. D..... 3			
Powell, Ambrose V..... 41			
Pusey & Jones Co..... 5			
Record of American & Foreign			
Shipping..... 6			
Red Star Line..... 13			
Richardson, W. C..... 40			
Sadler, Perkins & Field..... 41			
Safety Car Heating & Lighting Co. 3			
Sands, Alfred B. & Son..... 12			
Scherzer Rolling Lift Bridge Co. 9			
Schrader's Sons, A..... 1			
Schwencke, Kirk & Co..... 41			
Seaboard Steel Casting Co..... 32			
Shaw, Warren, Cady & Oakes... 40			
Shelby Steel Tool Co..... 14			
Sheriffs Mfg. Co..... 8			
Shipowners Dry Dock Co..... 16			
Shurick, F. S..... 33			
*Smith & Son, Abram..... 38			
Smith Co., L. P. & J. A..... 36			
Smith Coal & Dock Co., Stanley B. 39			
Smith, Stanley B. & Co..... 39			
Smooth-On Mfg. Co..... 9			
Spencer, H. R..... 40			
Standard Chain Co..... 6			
*Standard Oil Co..... 14			
Standard Releasing Hook Co... 35			
Stirling Co..... 15			
Stratford Oakum Co., Geo..... 6			
Sturtevant, B. F. Co..... 48			
Sullivan & Co..... 40			
*Superior Iron Works..... 36			
Superior Ship Building Co..... 46			
Taylor Water Tube Boiler Co... 15			
Thropp, J. E. & Sons Co..... 12			
Thurston & Bates..... 41			
Trout, H. G..... 8			
Truscott Boat Mfg. Co..... 5			
Union Machine & Boiler Co..... 38			
Upson-Walton Co..... 48			
U. S. Graphite Co..... 13			
U. S. Metallic Packing Co..... 48			
U. S. Shipbuilding Co..... 4			
Walker, Thomas & Son..... 3			
Warrington Iron Works..... 5			
Waterbury Brass Co..... 48			
*Watson-Stillman Co..... 47			
Weeks, F. H..... 40			
Wellman-Seaver-Morgan Co..... 2			
Westinghouse Electric & Mfg. Co. 6			
White, Johnson, McCaslin & Can-			
non..... 40			
*Willard, Chas. P. & Co..... 18			
Wood, W. J..... 40			
Youghiogheny & Lehigh Coal Co.. 30			

PERE MARQUETTE
R.R. & STEAMSHIP LINE

Chicago, Milwaukee, Manitowoc,
and Grand Rapids, Saginaw,
Port Huron, Detroit, Toledo

H. F. MOELLER, Gen'l Passenger Agent
Send for folder. DETROIT, MICH

The Erie & West. Transportation Co.
ANCHOR LINE.

PASSENGER SERVICE Steamers.

India. China. Japan. Tionesta.

PORTS OF CALL.

Buffalo. Erie. Cleveland.
Detroit. Mackinac Island.
Sault Ste. Marie. Marquette. Houghton.
Hancock. Duluth.

FREIGHT SERVICE Steamers.

Alaska. Codorus. Mahoning.
Schuykill. Conestoga. Clarion.
Junata. Lehigh.
Lycoming. Susquehanna. Wissahickon.
Conemaugh.

PORTS OF CALL.

Buffalo. Erie. Cleveland.
Detroit. Sault Ste. Marie. Marquette.
Houghton. Hancock. Duluth.
W. Superior. Chicago. Milwaukee.

CHAS. B. MARKHAM, J. C. EVANS,
General Passenger Agent, Western Manager,
Buffalo, N. Y. Buffalo, N. Y.

LAKE SHORE & MICHIGAN
SOUTHERN RY.

Eastward.

No. 18, Southwestern Lim
No. 22, Lake Shore Lim.
No. 20, Chi & Cleve Ex.
No. 28, N Y & Bost Ex.
No. 40, Toledo & Buff Ac.
No. 32, Fast Mail
No. 44, Ac via Sandusky.
No. 46, Southwestern Ex.
No. 106, Conneaut Accom
No. 6, Lim Fast Mail.
No. 26, 20th Cent L.m.
No. 10, C. N Y & B Sp.
No. 16, New Eng Rx.
No. 2, Day Express.
No. 126, Norwalk Accom.

Westward.

No. 11, Southwestern Lim
No. 7, Day Express
No. 15, Bost & Chi Sp.
No. 19, Lake Shore Lim.
No. 23, Western Express.
No. 33, Southern Express
No. 133, Cleve & Det Ex.
No. 47, Accommodation.
No. 141, Sandusky Accom.
No. 43, Fast Mail
No. 127, Norwalk Accom.
No. 37, Pacific Express.
No. 3, Fast Mail Lim.
No. 115, Conneaut Accom.

*Daily. †Except Sunday.

Trains Nos. 23, 26 and 37 run via Erie Station.

City Ticket Office, 237 Superior St.

Arrive from Depart

West East.

1:50am
2:15am 2:20am
7:20am
7:40am 8:00am
10:00am 10:40am
11:25am 11:30am
11:40pm
3:30pm
4:30pm 4:45pm
7:40pm 7:43pm
7:50pm 7:50pm
10:30pm 10:35pm
10:50pm 10:55pm
11:10pm 11:25pm
11:30am

Arrive from Depart

East West.

3:25am
3:30am 6:10am
3:10am 3:15am
7:15am 7:20am
10:30am 10:35am
12:25pm
12:45pm
11:20am 1:30pm
4:30pm 4:40pm
4:35pm 4:50pm
7:00pm 7:20pm
10:50pm 10:55pm
8:30am

THE CLEVELAND & BUFFALO
TRANSIT COMPANY



CONNECTING

CLEVELAND
and BUFFALO

"WHILE YOU SLEEP"

UNPARALLELED NIGHT SERVICE, NEW STEAMERS

CITY OF BUFFALO

AND

CITY OF ERIE

Finest and fastest steamers run in the interest of
the traveling public in the United States.

TIME CARD

DAILY INCLUDING SUNDAY

LEAVE ARRIVE
Cleveland 8 P. M. Buffalo 6:30 A. M.
Buffalo 8 " Cleveland 6:30 "

CENTRAL STANDARD TIME

ORCHESTRA ACCOMPANIES EACH STEAMER

SPECIAL LOW RATES CLEVELAND TO
BUFFALO AND NIAGARA FALLS EVERY
SATURDAY NIGHT, ALSO BUFFALO TO
CLEVELAND.

W. F. HERMAN, General Passenger Agent
CLEVELAND, O.

WILLIAM L. BROWN, President.

B. W. WELLS, Vice-Pres.

O. R. SINCLAIR, Sec'y & Treas.

ALFRED G. SMITH, Gen'l Mgr.

CHICAGO SHIP BUILDING COMPANY,

LONG DISTANCE TELEPHONES.
Ship Yard and Dry Dock Office,
"South Chicago 40."
Chicago Office, 1125 Rookery,
"Harrison," 1207.

**Steel Ship Builders and
Dry Dock Proprietors.**

Dry Dock and Yards: 101st St. and Calumet River,

CHICAGO, ILL.

MILWAUKEE DRY DOCK COMPANY*MILWAUKEE, WISCONSIN***SHIP REPAIRS****OF ALL KINDS**

**Two Ship Yards offer every Facility for the
Repair of both Steel and Wooden Vessels**

South Yard Dock....

*is 450 ft. long on keel blocks; 460 feet over all;
56 feet width of gate, and 16 feet over sill.*

West Yard Dock....

*312 feet on keel blocks; 45 feet width of gate,
and 12 feet over sill.*

*RUDDER PIT IN EACH DOCK.**ELECTRIC LIGHTS FOR NIGHT WORK.*Main
Office at

SOUTH YARD,
Foot of Washington St.

EDWARD SMITH, President.

WILLIAM KNIGHT, Asst. Sec'y & Treas.

W. T. NEVINS, Superintendent.

THE BUFFALO DRY DOCK CO.

GANSON STREET AND BUFFALO RIVER.

Operating Four Docks, Sixty-ton Shear Legs, and in every way Equipped

WITH MODERN PLANT FOR

The Building and Economical Repairs of**STEEL & WOODEN SHIPS**

LONG DISTANCE TELEPHONE CONNECTIONS:

Office Telephone, 515 Seneca.

President's Telephone, 279 Seneca, Office.

President's Telephone, 209 Bryant, Residence.

Asst. Sec'y & Treas., Telephone, 609 Bryant, Residence.

Superintendent, Telephone, 108 South, Residence.

THE SUPERIOR SHIPBUILDING COMPANY

**Dry Dock
and Repairs
of All Kinds**

**SHIP AND
ENGINE
BUILDERS**

**Two Largest
Dry Docks
On the Lakes**

Large Stock of Material Always on Hand for Repairing Wooden and Metal Ships.

**Repairing Promptly Attended
to, Night or Day.**

West Superior, Wis.

The Jenks Ship Building Co.

STEEL SHIP BUILDERS, MARINE ENGINES AND BOILERS.

Prompt Attention Given to Repairs of all Kinds on Ships, Engines and Boilers.

OFFICE AND MACHINE SHOPS
AT FOURTH STREET.

YARDS AT FOOT OF LINCOLN
AVENUE.

PORT HURON,

MICHIGAN.

MORAN BROS. COMPANY

SEATTLE, WASHINGTON

SHIP AND ENGINE BUILDERS

STEEL AND WOOD VESSELS, STEAM OR SAIL
FOR OCEAN, SOUND AND RIVER SERVICE

FOUNDRY, MACHINE, BOILER AND FORGE SHOPS

LARGEST TOOLS AND EQUAL TO ANY REQUIREMENT
HEAVY FORGINGS A SPECIALTY

DRY DOCK AND MARINE RAILWAY

Two-Section balanced floating dry dock, 400 ft. long, 60 ft. between
towers; patent steel wedge keel blocks; 12,000 tons displacement.
CAPACITY OF MARINE RAILWAY 1500 TONS

SHIP CHANDLERY, ENGINEERS' SUPPLIES

SAW AND PLANING MILL

CAPACITY: TIMBER, 48 INCHES SQUARE, 125 FEET LONG
Including every description of ROUGH, DRESSED or KILN DRIED
YELLOW FIR, RED CEDAR or SPRUCE
We make a specialty of long and large timber and can DRESS FOUR
SIDES 20 x 30 INCHES.

SPARS THE LONGEST, LARGEST, CLEANEST AND BEST IN THE
WORLD; ROUGH OR HEWN.
PILES OR TIMBER OF ANY DESCRIPTION.

CARS FROM ALL TRANSCONTINENTAL ROADS
ENTER OUR YARDS AND DOCKS

DOCK SHIPMENTS TO ALL PARTS OF THE WORLD

ELECTRIC CRANE Capacity to transfer 75 tons from car to vessel
WE INVITE CORRESPONDENCE

THE ONLY

MARINE DIRECTORY

BLUE BOOK

—OF—

AMERICAN SHIPPING

NOW IN ITS EIGHTH YEAR.

♦ ♦ ♦ ♦

Every ship builder, marine engine and boiler builder, ship owner, naval architect, marine engineer, and, in fact, everyone in the United States whose business is with ships is mentioned in the Blue Book and his address given. The aim has been to make it a complete working directory of the marine trade of the United States. With its aid you may reach anyone connected with this great branch of industry.

Its statistics of waterborne commerce are thoroughly reliable. The section devoted to the commerce of the great lakes with its iron mines and their output, its coal trade and dock facilities, its grain trade and elevators, its ships and their owners, is very thorough and absolutely authentic.

♦ ♦ ♦ ♦

MARINE REVIEW PUB. CO.

39-40-41 WADE BLDG., CLEVELAND, O.

EIGHTH REVISED EDITION.

Scott's Coast Pilot for 1903.

Great Lakes and Connecting Waters,

—At \$1.50.—

For sale by MARINE REVIEW PUB. CO.

Nautical Encyclopedia PRICE \$3.00.

Is in all respects a work up to date, correct as to every term known to the shipping world.

Divided as to departments of Naval Architecture, Marine Engineering, etc.

SENT ON APPROVAL.
CARRIAGE PREPAID

ORDER FROM

THE MARINE REVIEW PUB. CO.,
39-41 Wade Bldg., CLEVELAND.

"Steel Ships

THEIR CONSTRUCTION AND MAINTENANCE."

A valuable work, just from the press,
by THOMAS WALTON,
Author of "Know Your Own Ship."

*Not highly technical, but well suited to Ship
Superintendents, Marine Engineers,
and students of ship construction.*

INTRODUCTION deals with steel from its crude state in ore to finished product in ship material. Then follows chapters dealing with principal structural features and alternative modes in which a vessel may be built. Largest section of the book treats in detail of the construction and combination generally of the various parts which go to make up the whole ship structure—framing, plating, stern frames and rudders, riveting, pumping and ventilation and includes also remarks upon launching

Price, \$5.50.

THE MARINE REVIEW PUB. CO.
CLEVELAND, O.

PROPELLER WHEELS
SOLID AND SECTIONAL
AETNA GRATE BARS,
TIMBERHEADS, CHOCKS, ETC.

THE MACBETH IRON CO.
CLEVELAND, OHIO
57 WEST CENTER ST.

ENGINEERS, FOUNDERS AND
MACHINISTS.
HEAVY FORGINGS
ENGINE REPAIRS.

Lighting Sets

.... FOR

Steam Yachts

LEAST WEIGHT
FOR GIVEN OUTPUT



Send for
Bulletin G

B. F. STURTEVANT COMPANY,
BOSTON, MASS.

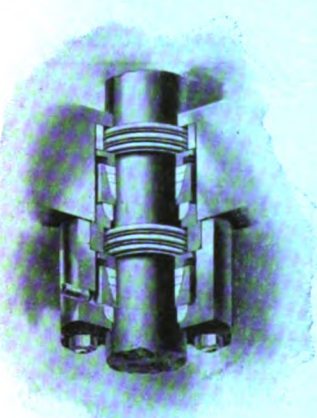
NEW YORK.

PHILADELPHIA.

(5)

CHICAGO

LONDON.



Class No. 1 Packing.

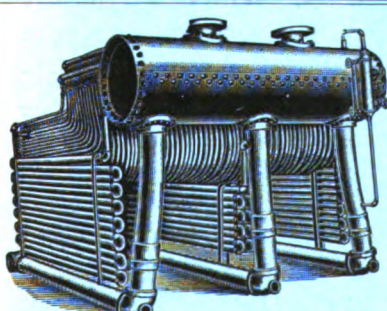
United States Metallic Packing Co.

427 NORTH 13TH ST.
PHILADELPHIA, PENN.

SEND FOR CATALOG

CHICAGO

509 Great Northern Building



Perspective view of the 250 H. P. boiler built for the steam freighter "Clara," having 6 ft. space and 8 ft. length; 34.4 sq. ft. of grate area and 1,900 sq. ft. heating surface; weight of boiler and water, 14,000 lbs. Replaced a return tubular boiler, thereby saving in dead-weight of boiler and water, 16½ tons. The Clara now has 14 in. less draft and an increased earning capacity of \$10 per day.

Boyer Sectional Water Tube Boilers are of an entire new design, are simplest in construction, are accessible to all parts, are rapid steamers with short circulation, have low center of gravity, have no joints in the fire, have no dead ends, occupy less space in width, length and height than any other, are easily fired, can be repaired or set up by any ordinary mechanic, do not require a brick casing, and are shipped whole or knocked down into packages for transportation by man or beast.

Kindly mention this paper.

L. BOYER'S SONS,

90 Water Street,

:

NEW YORK, N. Y.

FOR SATISFACTORY Wire Mooring Lines

CALL ON

THE UPSON-WALTON CO.
CLEVELAND.

THE MOST COMPLETE STOCK

BRASS and COPPER

in Sheets, Tubes, Wire and Rod.

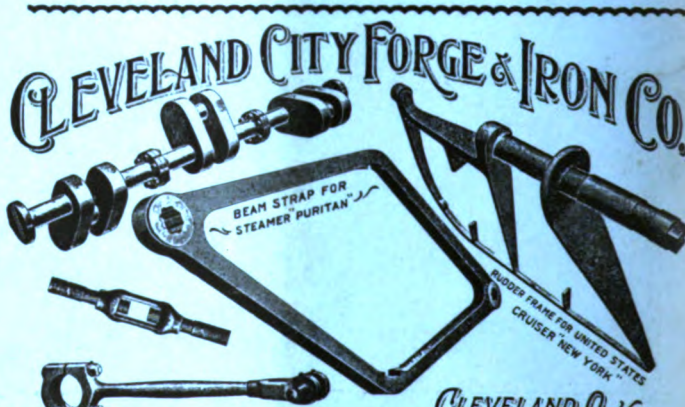
Service Right, Quality Right, Prices Right

Waterbury Brass Co.

122 to 130 Centre St., :: :: :: New York City

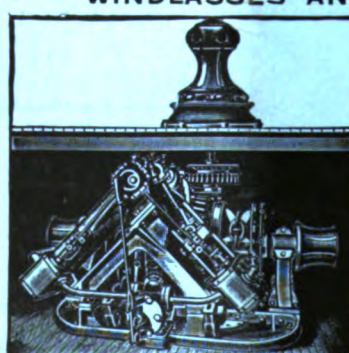
Always have our classified Stock List before you

YOURS FOR THE ASKING



IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT.
COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.

WINDLASSES AND CAPSTANS



HYDE WINDLASS COMPANY,

The Hyde Steam and Power Windlasses and Capstans are the best in the market.

They have been selected for most of the vessels now building for the Navy Department, Revenue Marine, Light-house Board and United States Coast Survey.

They are being furnished for the majority of the highest class Steam Ships, Merchant Vessels and Yachts now building.

BATH MAINE.

LIFE PRESERVERS-BUOYS.

Acme. Solid Cork. Granulated Cork. Each Preserver stamped by U. S. Inspector guaranteeing proper buoyancy. Cork Filled Yacht Fenders. Cork Mooring Buoys. Material and Finish Guaranteed. Orders filled promptly.

ARMSTRONG CORK COMPANY,

Boston. New York. Philadelphia. Pittsburgh. Chicago.
St. Louis. Baltimore.

Midland Towing and Wrecking Co., Ltd.

MIDLAND, ONT., CANADA.

JAMES PLAYFAIR, { Pres't and
D. L. WHITE, Vice-President.
J. W. BENSON, Sec'y and Treas.

First-Class Tugs for Wrecking, Raft Towing, Etc. Steam Pumps, Divers, Jacks, Hawasers, Lighters.